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Additionally, Compec features many close encounters of the recruitment kind whether by design or chance. In the role of international job exchange and forum, Compec has few equals.

Keeping in touch is very much the name of the promotion stakes, whether you are a senior sales or DP manager or a potential entrant to the computer industry.

Major exhibitions and conferences offer several levels of job activity such as an in-house promotional lever: informing your boss, for example, that a friendly data processing manager was making interesting job suggestions which are hard to resist. Unless a rise can be negotiated, the away day procedure will be triggered.

The DPM himself can make use of Compec for conducting some basic research into trends of pay perks and benefits. In fact his visit to Compec could well be sponsored by the installation team for this very self motivated purpose.

Meanwhile other interested parties can be doing some research of their own. The visiting DPM who arrives, accompanied by his systems and ops managers, could well enjoy a very lavish budget and operational resources, very understanding bosses or a declining workload.

On look-out

The DPM who gives himself a couple of hours to cover the exhibition before rushing back to base, is either totally insecure, inefficient or plain optimistic. Such attitudes are duly taken down and noted by interested vendors and rival installation management.

However a large slice of the job action at Compec involves the trade — whether sales, distribution or services. Salesmen, possibly on the look-out for a new position, lose little time in visiting the stands of potential employers.

Not only do stands reveal the exhibitors' products and services, but also the general marketing approach of the organisation.

The hard selling company which has deliberately placed salesmen in the aisles in order to waylay visitors, could well be one to steer away from.

Similarly, the disorganised stand, where customers, salesmen and engineers are jostling for very limited space, could well indicate a disorganised product line.

Clearly, the image and style of the sales company is fully revealed along with the products and services. If the stand resembles the Hanger Lane gyratory system in the rush hour, with visitors clamouring for attention and brochures, obviously there are good recruitment prospects, plus a guaranteed sales quota.

Keeping in touch at Compec

But where the stand resembles Hackney Marshes on a particularly inclement day, with stand personnel idly completing a crossword, reading the back pages of Computer Weekly, or chatting among themselves, then clearly recruitment prospects are not good — unless you happen to be looking for available sales personnel.

Where, however, the most imaginative display item on the stand is an outstanding collection of girl demonstrators, almost dressed in leopard skin micro leotards and large smiles, then the odds are that the organisation is strapped for sales or presentation ideas.

For the company on the look-out for good recruits, Compec offers an ideal opportunity for off-the-formal record meetings.

If, at the end of a gruelling day when all parties feel they have been taking part in a marathon squash and sauna session, some semblance of mutual respect still survives, then prospects for future business relationships seem promising.

Job hunting is by no means limited to senior industry positions. Analysts, programmers and operators can possibly pick up useful leads for prospective employment.

Despite the rapid growth, the computer industry is still closely linked and insider trading flourishes at Compec. Keeping close tabs on who is leaving where, and who is joining when, is information retrieval of an impressive processing order.

There would certainly seem to be a need for some central authority DP recruitment and training. Depending on the sources, there are vacancies for new programmers every month (IHS), a 300,000 current shortfall of DP professionals (European Computing Services) and a 9% annual increase in DP jobs (Datastream).

Far from declining, the computer industry is flourishing with many companies reporting record order books, prospects and delivery dates.

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High St. micro venture runs into trouble

CURRY'S venture into the high street retail microcomputer business appears to have hit problems, as sales of its larger business systems fail to live up to expectations.

Robert Webb, the commercial director of Micro C, resigned last week over a disagreement with managing director Brian Moon on the product range and management and marketing techniques.

Sales of Curry's Micro C 2000 (based on a Pertec microcomputer) and the Pansonic JD 800U are much lower than expected — "disastrous", said one company insider.

Sales at the lower end of the product range, of the Commodore Pet, the ITT 2020 and the Apple II, have been doing reasonably well, however.

Prices

Webb joined Curry's 18 months ago after six years with Commodore and it had been his responsibility to develop the product range.

Webb said that he believed the company would have more success with multi-tasking, multi-terminal 16-bit systems, and that prices of existing products should have been cut.

In addition he said that particular fault lay with the handling of publicity which has been directed more to the Press than to the end-user.

A direct mail shot in June had had particularly poor results.

These problems have come to light in a week when Curry's has announced the opening of three additions to its Micro C chain of outlets, with another two planned to open later this month. The new outlets are all within existing Curry's branches at Southampton, Leeds and Exeter.

In the future Curry's might find new competition in the high street in the form of a new chain of microcomputer shops which Robert Webb is now planning to set up.

Brisk trade on the Computer Weekly stand minutes after the doors opened at Compec on Tuesday. The exhibition gave a chance for Computer Weekly staff to meet many of its readers for the first time.

We're moving

NEXT week Computer Weekly will come to you from . . . Sutton. Which is a roundabout way of asking readers and advertisers to remember that from Monday, November 10, our address will be:
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Storage enters IBM compatible race

FOLLOWING its abortive attempt to take over Amdahl earlier this year, Storage Technology has said it intends to manufacture large scale IBM compatible mainframes itself. First deliveries are expected early in 1984 and the machines will compete with the IBM H-series.

Storage is entrusting development of its IBM compatible computer family to an organisation financed by what is described as "a separate, independently owned entity". This set-up is intended to allow Storage to continue using its own financial resources for developing its existing lines of IBM compatible peripheral products and also to remain profitable.

Exclusive

But Storage is assigning some of its key engineers to the development project and has reserved the right to purchase the designs of the IBM compatible machines and to manufacture and market them on an exclusive basis.

Key factor

On the marketing side Storage is in a strong position because of the large established base of big IBM sites using its tape and disc drive products.

A key factor determining its validity as mainframe manufacturer will be its progress with emitter coupled logic. At the moment Storage fabricates 1,000 gate arrays in small quantities for special purpose applications in its peripheral products. But its ambitions as a semiconductor manufacturer were underlined when it called off its takeover talks with Amdahl.

Storage feared that Fujitsu, which owns 27% of Amdahl, might stifle its attempts to become a major supplier of semiconductor components and assemblies to Amdahl.

Fujitsu made no attempt to interfere with the takeover talks between the two US firms but it is known to have approached Amdahl just before the deal was due to be finalised, asking for a review of the agreement under which it supplies Amdahl with large amounts of components and also completed CPUs.

6 and 9 mips H-series predicted

ACCORDING to one industry source, the IBM H-series will involve two uniprocessor machines, H3 and H5. The H3 will offer a power rating of six million instructions per second and cost \$2.8 million while the H5 will be rated at nine mips and is expected to cost \$3.7 million. Multiprocessor versions currently codenamed Sentinel and Belwin will follow later.

Costs per mips of the H3 and H5 are over the \$400,000 maximum IBM was aiming at. This is due to the much publicised chip yield problems that have dogged progress of the H-series.

Along with the two H machines, IBM is expected to announce a new 303X computer rated at 2.5 mips that will effectively supersede the 3031 and 3032. It will be upgradeable to the 3.5 mips 3033N and 5.3 mips 3033U. First deliveries will be in the first quarter of 1981.

Minister for Information Technology

A MINISTER for Information Technology has been appointed within the Department of Industry to act as a "single focus" for work in this area. He is Adam Butler MP, whose responsibilities up to now have been largely aerospace, shipbuilding, steel, and the NEB. The appointment follows many recommendations along these lines, the latest coming from ACARD (CW, October 2).

Butler will be responsible for computer hardware and software, capital and consumer electronics, and office automation. Viscount Trenchard will retain responsibility for "the applications of microelectronics"; the curious distinction between this and Butler's fields has not yet been clarified by the DoI.

Butler will continue to oversee British Telecommunications. Roy Croft will be his deputy permanent secretary.

Virtual aid for Z8000

VIRTUAL memory for the Z8000 16-bit microprocessor is under development at Zilog and is expected to be introduced by the end of next year. It will enable the processor to do full 32-bit addressing, rather than the 23-bit addressing of the current device.

Known as the Z9000, the family of virtual parts will comprise two segmented processors, the Z8003 6MHz device and the 8003A 10MHz device; two unsegmented parts, the 8004, 6MHz and the 8004A 10MHz parts; and corresponding memory management units, the 8011 and the 8012.

Holiday bookings on viewdata

THOMSON Holidays is planning to beat Prestel's main limitation from the travel industry's point of view — that bookings cannot be made and confirmed on the system — by installing a private viewdata system to provide a gateway to its mainframe-based reservations system.

The system being installed is a Redifon R800/70, for which Viewdata Pass Through software was announced in July (CW, July 17). Using the IBM 3270 interactive terminal protocol, it will provide a front end to Thomson's IBM 370/158 in central London and will act as a viewdata system in providing information on holiday services.

A six-month trial is to start next spring of an eight port system serving travel agents in 10 towns around London, including Bedford, Colchester, Guildford and Reading.

Redifon is developing software to support the ICL C03 protocol in its Viewdata Pass Through scheme and over the next 18 months plans to add support for X25 using the HDLC protocol as well as other protocols in the ISO seven-layer architecture as they are published by standards bodies.

Other tour operators and travel companies are interested in gateways to reservation computers.

● Olympic Holidays, a London-based tour operator, last week started a trial with four travel agents in the London area of a gateway into its Digital Equipment PDP-11/70 based reservations system which currently supports about 40 local terminals for entering bookings taken over the telephone.

A series of "help" frames is provided which explains how to use each part of the system, such as entering bookings and searching for hotels or resorts.

The travel agents are Hogg Robinson, Exchange Travel, Plan Travel of Sidcup, and Kingsbury Travel.

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Briefing

Plessey wins MoD contract

PLESSEY has won the prime contract for the Ministry of Defence's Ptarmigan tactical communications networking system which is to replace the present Bruin system and offer voice, data, facsimile and telegraphic links via radio and land lines.

Plessey expects to earn about half the contract fee, which is £150 million initially and may reach £500 million by completion of the project in 1984. The rest will go to subcontractors STC, Marconi, BICC, Airtech, Marshall of Cambridge and Membrain, who also shared in the seven-year £100 million development contract.

Burroughs sued

BURROUGHS in the US is being sued for \$1.9 million by a B800 user, Quality Books of Northbrook, Illinois, which is alleging that Burroughs "engaged in deception, false pretence, false promises and misrepresentations" when it sold the firm its B800.

\$500m takeover

TAKEOVER of Ampex by the US holding company, Signal Companies Inc (CW, October 28) is expected to be completed by January next year now that the two firms have signed a formal definitive agreement. It values Ampex at well over \$500 million and now awaits approval by shareholders.

Launch delayed

A LAST-MINUTE "reappraisal" of its marketing policy for the MicroPact microcomputer has caused the Israeli manufacturer Elbit to postpone its UK launch, due to have been made at Compec.

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Editor
Simon Timm 01-261 8033

Deputy Editor
Brandon Gamester 01-261 8686

Advertisement Manager
Harry Hutson 01-261 8359, 01-261 0503

Class Ad Manager
Brian Durrant 01-261 8597

Publishing Director
Dr J. A. G. Thomas

Editorial Director
Chris Hipwell

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Telegrams/Telex: 25137 BISPUS G

Branch Offices:
Birmingham: Lyndon House, 2-2 Walsall Road, Birmingham, B42 1SA
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Manchester: Grove House, Seymour Road, Old Trafford, Manchester M16 0WL
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COMPUTERVIEW

Taking a lesson from Memorex

READERS who were in the business six or seven years ago will probably remember a whole string of stories in Computer Weekly about the appalling losses being made by IBM compatible hardware manufacturer Memorex. In 1973 the company recorded a near fatal total loss of $119 million which, taking inflation into account, makes its current financial problems look insignificant.

A major contributory factor was IBM's manipulation of disc drive prices to counter what was then a relatively new and frightening challenge from firms like Memorex and Telex. The upshot was the series of unsuccessful and/or inconclusive anti-trust actions against IBM.

But financial resources at Memorex were also dangerously drained by what was then a novel and daring venture – a move into manufacturing small IBM compatible mainframes. Launched in March 1972, the MRX 40 and MRX 50 machines were described by Memorex as "the backbone of Memorex's strategy to build a major new corporate entry in the industry."

A year later MRX production was terminated, with a write-off of $40 million, after only 50 machines had been sold world-wide.

This history lesson is timely because the firm that now runs side by side with Memorex in the IBM compatible market, Storage Technology, has just announced its intention to manufacture and sell large-scale IBM compatible mainframes with early 1984 as the launch date. The question is therefore raised of whether Storage Technology, hitherto a financially rock solid enterprise, is going to bite off more than it can chew and find itself in the same terrible mess as Memorex seven years ago.

At the risk of making Computer Weekly look silly in two or three years' time when Storage Technology could be in trouble, the answer to that question is almost certainly "No". This is despite the fact that Storage's ambitions, in terms of the machines planned, are several orders of magnitude more daring than those of Memorex. The MRX 40 offered a similar performance to the IBM 360/20, a veritable flea-bite compared with the multi-million-mip IBM machines that Storage plans to match.

But Storage has no doubt learned a useful lesson from Memorex and other relatively small firms that have been swamped by the cost of over-ambitious development projects. If the "separate, independently owned entity" being set up to handle the development of the machines fails in its mission, Storage should be left intact.

But IBM is unlikely to introduce radical changes to the architecture or instruction sets of its big machines in the foreseeable future.

On the production side the important factor will not be tooling up or labour costs, as might have been the case when computer manufacturing was a lot more labour intensive. The problem will be getting the componentry right. So far Storage Technology's expertise with the key technology, emitter coupled logic, consists of fabricating 1,000-gate arrays in small quantities for special purpose applications in its peripherals.

Some indication of the progress that has to be made by Storage is provided by the computer division of Mitsubishi in Japan which plans to launch a family of IBM compatible machines at about the same time as Storage. The Mitsubishi machines will employ 5,000-gate ECL.

Some idea of the cost of development can be obtained from Mitsubishi's budget which has allocated a relatively modest [illegible] million for hardware. A major difference is that Mitsubishi has also set aside $50 million for producing its own complete package of systems software while Storage is assuming that its machines will host MVS. In this way Storage will also avoid another of the mistakes made by Memorex which was developing its own operating system, [illegible].

But the main reason why Storage Technology is far more likely than Memorex to emerge relatively unscathed from its leap into the IBM compatible processor business is that the market for such machines has now been established. So far only Amdahl and the big guns of Japan have delivered the goods in terms of large-scale mainframe hardware, but with the massive incentive of a huge base of IBM users with its peripheral hardware, Storage will no doubt pull out all the stops.

LETTERS to the EDITOR

Disabled out of work despite 'staff shortage'

MAY I refer to Focus (Time to Help the Disabled, CW, August 28) and George Penney's letter about the Threshold scheme (October 2).

As many of your readers may be aware, the courses in computer programming at Queen Elizabeth's Training College, Leatherhead, have created countrywide interest. When the first course of the present series was announced towards the end of last year, I was inundated with applications from all over the British Isles from severely disabled people anxious to obtain a place on the course. Well over 200 applications have so far been processed and over 100 candidates have undergone the interview and assessment period at the college.

Of those that were successful and eventually completed a course here, it is sad to relate that only a tiny proportion have been able to find employment in the data processing industry. The geographical spread of these students is wide, yet contrary to the alleged existence of thousands of vacancies for computer programmers, they are experiencing the utmost difficulty in obtaining interviews, let alone employment.

May I, through your columns, ask employers who may be looking for trainee computer programmers to consider employing these people? Alternatively, employers may be able to offer work experience which would help my ex-students to keep in touch with the DP industry and to make their track records more attractive. Funding exists through the MSC for the adaptation of premises to cater for the needs of the disabled. These ex-students have shown that they have the ability to complete the full TOPS computer programming syllabus satisfactorily, and I believe that it is the ability and not the disability which should be considered.

Currently, ex-students requiring employment come from Bristol, Blackpool, Dorchester, Rugby, Gloucester, Littleborough, Stevenage and Reading. I should be delighted to answer the queries of any prospective employer who may indicate an interest.

R. DENT,
Principal
Queen Elizabeth's Training College,
Leatherhead,
Surrey.

Pascal v Basic

THE views expressed by your correspondents in the Pascal/Basic controversy (CW, October 23) are fascinating.

1 – D. Burdett tells us that "Basic as a standard should have structured logic, ie DO-WHILE, IF-ELSE-ENDIF, CASE etc . . ." But if you put this in Basic it becomes a different language. It's not the Basic that is "the common denominator of micros", so why should people use it? And if it's a good thing, why wait for a hypothetical new Basic? Why not use Pascal which gives you powerful data structures as well?

2 – Paul Brazier suggests that the trouble with education is that "if we are not careful we try to lead the field instead of meeting the needs of industry as they are now". He confuses education with training. Training is for the present, education is for the future. If we had followed the doctrine of "meeting the needs of industry as they are now" in the past there would be very little computing in industry. In the 1950s, industry had no need for programmers or machine designers, and if the universities had, ostrich-like, concentrated on producing people skilled at wiring plug boards for punched-card tabulators (which industry *did* need at that time) there would have been no pool of skilled labour to facilitate the computer revolution.

Professor DAVID [illegible]
University of Southampton.

SyFa users' group mooted

I AM writing to canvass views on the subject of participating in a formal SyFa Users' Group.

If readers wish to be involved in such a group, please forward your views and comments to me.

Depending on the general response, it would be CA's intention to convene an inaugural meeting of the User Group during November/December of this year in the London area.

D. J. SPICER
Manager
Commercial Systems Division
CAI Limited,
Hertford House,
Maple Cross,
Rickmansworth,
Herts. WD3 2XD.

Value of TOPS

THERE has been a lot of correspondence about TOPS courses. Is there a tacit understanding that these courses offer anything useful to the industry? If so, this assumption does not emanate from the people who matter, the employers.

The majority of prospective employers ignore it. (Before I had any commercial experience they set aptitude tests; never once did I have the opportunity to display my course certificate.) The only time that TOPS has been mentioned is when some employers reminisce about previous disasters when employing TOPS-trained people.

At the end of an 18-week TOPS programming course (Cobol, Assembler, RPG II) run by Control Data Institute, we were told that we were "trained people" who knew "as much as, and probably more than, the average junior programmer". It was rather humbling to discover the truth: I knew little about commercial work and was applying that little with an atrocious style. In fact, I was obliged to re-learn everything from the viewpoint of professional standards.

TOPS people are producing certificates in a job-market where the majority of DP managers distrust all qualifications apart from "n years' experience". But even as they stipulate this, they know it is commercially unsound. There are any number of DP staff, with little time in the industry, whose insight and enthusiasm nonetheless make them very positive assets. They are balanced by a vast number of "experienced" computer people who are ambient logic-errors, looking for an unstable system to bumble into.

Policies of "internal promotion" and "advancement by experience" worked well in the days of sailing ships and inky ledgers, when loyalty and conscientiousness were paramount qualities. Nowadays keen intellects and disciplined professionalism are essential at all levels to control and direct DP.

Nonetheless, the old established policies for promotion still hold sway, ensuring that people who are already out of their depth will gradually move into increasingly key positions, allowing scope for ever more devastating commercial disasters.

As the government is concerned enough about computing to spend large sums retraining people in programming and analyst skills, would it not be wise to assist codification of professional standards? This would not only be of tremendous value to British computing in general, but the curricula and examinations of TOPS courses could be specified to produce people who could easily find work.

Surely that was the whole idea.

JOHN W. BAGGS
(Programmer, aspirant analyst)
Dunkirk Road,
Southampton SO1 6LX.

No connection

WITH reference to your article (CW, September 25) I would advise that IDAPS Computer Science of New Zealand acquired the Australian software house INSCOM.

There is a software company in Australia known as IDAPS, Australia. There is no connection between this company and IDAPS New Zealand.

KEN WESTLAKE
IDAPS New Zealand.

1984 and all that . . .

CONTRIBUTIONS from readers are welcome for our column of the strange things people say about computers. We will pay £5 for each item we publish.

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DONALD KENNETT AT THE VIEWDATA EXHIBITION

Prestel discount for upping sales of sets

REBATES on Prestel charges are to be offered to information providers who generate sales of Prestel sets. British Telecom is to take off £25 for each business user and £10 for each residential user who buys a set in order to use a specific information service.

This is part of the Prestel organisation's new strategy of attacking identifiable market sectors, which was described by Prestel marketing manager Kieran Levis at a workshop held during the Viewdata Exhibition in London last week.

Levis said that the new strategy would be backed by an advertising campaign in the specialist press in particular market sectors during November and December.

Extra pages on the system would also be allocated according to whether set sales were generated and Prestel management would tell IPs what they thought of their information.

The first market sectors to be attacked would be investment, travel, commercial property and agriculture. Further sectors would be sought out where there was a daily need for specific information and where Prestel had a distinct advantage, such as where the information was simple and needed to be updated frequently.

Travel sector specialist Vanessa Pyne said it was difficult for tour operators to disseminate information to the UK's 5,600 travel agents and, from the agent's point of view, much information came through his letterbox which was difficult to manage and soon became out of date. The industry's initial zeal had been dampened by the realisation that bookings could not be made and confirmed for walk-in clients via Prestel, but information on availability was still useful. Over 1,000 agents had sets and more were getting them each month.

The largest single sector was investment, and within that, commodities information was the fastest growing area. The metal market had the highest page access rate, 40 times more than the Stock Exchange which was the next highest. Details were updated every three minutes and even scrap metal dealers were showing a keen interest in Prestel because of it.

The investment sector was thought to have more than 30,000 potential users.

Sony poised for UK market thrust

JAPANESE consumer electronics giant Sony showed three prototype viewdata devices at the Viewdata Exhibition: a thermal printer, a terminal with a nine-inch screen and a six-inch display monitor.

Viewdata product manager Richard Hunt said the company would gauge the reaction from the market before going ahead with production. He thought it was likely there would be a need for the 9in. model.

200 sold

He said the factory in Bridgend, Glamorgan, was gearing up to enter the UK viewdata market in a big way in the first quarter of next year with the 14-in. and 22-in. terminals that were launched at Viewdata 80 in March, 200 of which were sold to British Telecom for the Prestel International market trial.

Centronics showed the screen image printer it launched at last year's Viewdata Exhibition in prototype form, which went into production in September. It is a spark printer which prints on aluminised paper and links to raster scan displays via a three-line interface, which includes a dot clock signal and which Centronics hopes will become a de-facto standard.

Other printers use the video signal as it is fed to the screen, or have their own character generators, which must therefore be the same as the one in the display device to be copied from.

Adapters on show included the £260 device from Oracle Electronics of Upminster, Essex, and the £575 device from B&B Computers of Bolton, Lancs, which has an RS232 interface for linking to personal computers, as well as the modulated video signal to be fed to a television via the aerial socket and a built-in modem to connect to the telephone line.

Digitisers

VG Electronics of Hastings, Sussex, and Video Electronics of Manchester both showed digitisers for turning pictures from a video camera into Prestel-style graphics. The VG Electronics model costs £2,100.

Lion House, an electronic department store in London's Tottenham Court Road, announced plans to produce a colour Prestel set for £650.

Barco, the Belgian electronics company which is a major terminal supplier for the Stock Exchange's Topic private viewdata system, showed a new prototype version of its PVS12 portable five-inch viewdata terminal which has been re-engineered so that it will fit into a Samsonite briefcase.

Local editing

This model has been ordered for a travel agent's offices in Holland, where it is to be used as a desk top terminal, as well as driving a slave monitor which can be switched between viewdata and video tape display use in promoting holiday and travel services.

Barco's terminals are based on the Motorola 6800 processor and all offer local editing. The cassette interface has two channels, for recording spoken comments in parallel with viewdata frames.

Yellow Book for ISO

CONFLICT between two rival specifications proposed for the Transport Service layer of the ISO seven-layer architecture for open systems interconnection seems close to being resolved.

The suggestion has been made that one of them, the "Yellow Book" developed by a working group of the UK's PSS User Forum, be used in an enlarged definition of the Network layer – the layer below Transport – which was previously thought to have been defined by X25 in the case of packet switched networks and by X21 in digital circuit switched networks.

Brian Sexton of British Telecom told a meeting on high-level protocols at the Institution of Electrical Engineers in London last week that the rival proposal from the European Computer Manufacturers' Association was a good candidate for adoption by the British Standards Institution as a definition of the Transport Service.

The relevant committee of BSI, DPS20 WG3, was working on four documents, containing a definition and a protocol for the Transport layer and the Network layer of the ISO architecture, he said.

Call to broaden appeal of IBM user group

"THE concept of our organisation will have to change," declared Graham James, new chairman of the IBM Computer Users' Association. "We must make it attractive not only to the DP professional but to those further down the end-user path; professionals such as accountants who will be using office automation."

He was speaking at the CUA meeting in York last week, held for the first time in conjunction with IBM, and incorporating a display of IBM hardware including the 5520 administrative system, the System 38 and the Displaywriter.

James recognises the Displaywriter as a product which will bring a different category of user to IBM's fold, although likely to find custom among the large system users at first.

Outgoing chairman Des Lee said: "The CUA is there to represent the wishes of the users. We are unique in being UK-based, and not product, but service oriented."

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Downtime

by Chad

How are the mighty fallen!

IT'S always nice to hear about the boo-boos of the great. Casting doubt on the authority of the Bible is, of course, outrageous, and when one starts to cast doubt on the author of the bible of computing and his dicta, one feels hardly less nervous.

All the more power, then, to the programming staff of Logica VTS who have turned up a bug in the string search algorithm invented years ago by Donald Knuth, of The Art of Computer Programming fame.

The Logica team have used Knuth's algorithm in the information retrieval package that is shortly to be added to the Nexos 2200 word processor. This bit of the program simply searches for the occurrence of any given string within a document.

Various brainy people have devoted weeks and weeks to thinking up clever algorithms that will do string searching at lightning speed, sometimes going backwards through the document, doing handstands and so forth. This requires lots of labyrinthine theorising, and it turns out that Knuth's labyrinth has a sizeable flaw in it.

His algorithm, one of the best known, fails to work in one particular case where a character is repeated several times.

The Logica people wrote with some smugness to Knuth at Stanford to point out the master's gaffe. He replied that he already knew about it, but just hadn't got around to publishing a correction! Ahem!

Dr Lesley Syme . . . a great fan of sheep.

Sorting the sheep from the . . . ?

THE lady in my picture is Dr Lesley Syme, a New Zealand scientist and expert in sheep behaviour. The name of the sheep is not recorded, nor are his/her reactions to having all those wires and things attached to his/her back.

What is known is that Dr Syme, working in Perth, Western Australia, is using body sensors, radio and a computer to study the way sheep run around in handling yards.

Dr Syme is a great fan of sheep. "They're not silly, stupid and stubborn, as most people think," she says. "They only appear so under the husbandry conditions imposed by man. They exhibit their most frustrating behaviour in yards, where our requirements that animals be treated as isolated economic units conflict with the sheep's basically sociable nature."

I would have thought that being in a sheep pen would force sociability on any person or thing. Anyway, it turns out, Dr Syme is principally concerned with the individualists amongst sheep. "We have found that about 10 per cent of the sheep are unco-operative in the yards and one of the problems is to identify this group that stop, stumble, refuse to turn round and generally hold up movement through the race," she says. Then I presume the sheep gestapo are sent round to winkle out the troublemakers: those who refuse to conform, those who beat a different drummer.

The computer records the sheep's leg movements, its heart rate, and the force used to push against a gate to get out of the pen. A good measure of someone's "freedom drive" then. The sheep are stimulated by a mixture of sounds — according to Dr Syme: "The barking of dogs, the clashing of pipes on walls, the clattering of tin cans."

Then there's an express trolley service to the sheep loony bin for those that need it.

GILB'S MYTHODOLOGY

Try digging that hole somewhere else!

THE third simplification principle is: If you cannot find a simple enough alternative, then try looking at an entirely different set of alternatives.

This is the same as De Bono's famous thinking principle of digging a new hole elsewhere instead of digging the same hole deeper.

Let me start with an example: A client asked me to help him decide which of three medium-scale computers was best for his small service bureau business. He had tried to evaluate the bids but they were not simple enough for him to be able to make a clear decision.

What would you suggest as a simplification: perhaps absolutely identical hardware/software/services and simple selection based on lowest bid?

Perhaps. But that is still a complex, and really impossible process.

I suggested digging another hole. But first I applied one of the other fundamental principles of simplification: Finding out what the highest level goals were.

Survival

Would you be surprised to learn that the highest level goals in this case were "Economic survival of the service bureau in the long run so it could be given to the owner's son"? (ie. it was not to get the best medium-scale computer at the lowest price).

So we ended up digging a new hole.

We discarded all "medium-scale computer" choices — because it was the wrong hole. We couldn't show that any of them would reach the owner's goal. Instead we ended up working with individual service bureaux, larger clients, designing tailor-made packages and decentralised minicomputer solutions. This gave growth with low risk and stopped the threatened flight of traditional batch customers away from the service bureau.

It also illustrates another of the simplification principles: Divide your solution into two or more different solutions. In this case, instead of getting a new batch computer to handle all traditional business, the service bureau kept the old batch computer for the smaller clients and initiated a software house/turnkey project activity in order to save the larger customers which were in the process of leaving to get their own smaller computers. These two solutions were necessary to support his ultimate goal: economic survival.

Selection of a new computer alone might have threatened his goal by giving conversion costs and fixed machine costs with decreasing batch business.

Only way

In another case, a porcelain factory asked me to help decide which small scale computer or remote-terminal to service bureau solution was best. Their old batch service bureau was threatening to raise the yearly data processing costs from £300,000 to £400,000, and they liked the idea of having their own.

A visit to their service bureau revealed that they were about 30% of that small bureau's business, and that the service bureau had recently lost a similar customer who went over to his own in-house computer.

I told the service bureau manager what I thought was the only way to guarantee any business — a written guarantee that all services previously costing £300,000 per year would cost £100,000 per year. He thought I was crazy, "digging such a hole in such unheard of territory". He pointed out that he risked going out of business with such prices. I pointed out that he risked going out of business unless he became more competitive.

Tom Gilb is an independent consultant, lecturer and author on computing topics.

The next morning he rang me at my hotel early and invited me over. Before I left his office I had got him to sign a hand-written contract for my client guaranteeing all DP services previously given for £100,000 (one fourth of what he was asking a day earlier). The cost of data processing curve for the factory showed a dramatic drop that year!

The service bureau had to go through an unpleasant "slimming" process. But it survived and kept that client for the next seven or so years.

Proud

The DP manager at the factory was originally rather angry with me (the managing director was delighted) because he didn't get his toy. But years later he was proud to have been a part of that saving. How many of you have actually cut your DP service bill to a third of last year's bill while maintaining service levels?

Again, the same simplification process was used — asking what are the ultimate goals which must be satisfied with any solution, and then looking for another place to dig your hole.

Gilb's hypothesis: If you want to simplify your solution, you might have to get out of the hole you are digging — and find another place to dig. You might find some softer earth in the new one. (Thanks, De Bono!).

FOCUS

Beginning and end of it all

SPEAKING at a London conference, Colin Leeson of Langton Information Systems suggested there is a place for word processors in most organisations. They are also apparently a necessary starting point for more sophisticated office automation and text processing system development.

There could, however, also be a case for suggesting that the WP system is the beginning and end of many office systems. Where this end finishes up could be the back shelf of the store room — the office having discovered that they could manage as well, if not better, without the benefit of a WP system; the desk of the office manager who has discovered a novel way of filling-in his idle time; or as one link in a battery of WP machines looping round the organisation.

Channels

The odds are not exactly high on each alternative. Often the WP has been brought into the company by the last but one administration manager, keen to show his mastery of the new office technology. Having been delivered, unwrapped and plugged-in, considerable delay then takes place until someone makes contact with the WP sales organisation and requests the combined services of a demonstrator, engineer and possibly system analyst. By the time the team arrives on site, several more administration managers have moved on, up, down or possibly out.

The vendor team then has to spend an uninteresting time trying to establish the fresh channels of command and communications before calling it a day. Being responsible vendors, they probably pause to leave a user's manual plus contact phone number. But should a responsible individual within the company surface, the picture could rapidly change. The full potential of the WP system is rapidly realised in double quick time, half the authorities find themselves on a course while the other half are bidding for their weekly copies in London.

Unfortunately, the WP system is often regarded as related more to the typing pool than the pool of computing expertise. As a result, the typing supervisor is more likely to be part of the advice panel than the DP professional. Equally a waste of corporate time and money is seeking advice from industry consultants — unless they have specialist experience in WP and office technology. The average consultant would be more at home processing words with academic colleagues at such seats of learning as the IDPM and the BCS.

Upgrade

It is normally at this late stage of the WP exercise that the DP man is asked to sort out the WP project. Usually reluctantly, the DPM with a senior analyst undertakes a speedy evaluation of the system requirements coupled with the equipment potential. All too often the team discovers that the requirements are way above the capabilities of the WP system, and there is not much that can be done except perhaps to arrange a part exchange upgrade.

While the office management team may well learn its expensive lesson, the WP system will struggle on as best it can, seldom fulfilling the promise of a bright technological tomorrow.

If the office of the future is to have any chance of success, then the related sciences of WP and DP must be acknowledged. Otherwise that future will be far off.

Ada course

A COURSE on "Programming in Ada is being run by ICS as part of the current UK and Europe software engineering curriculum. The course anticipates the tremendous demand for programmers which Ada contracts are expected to generate. The first presentation was given during the Military Defence Expo at Wiesbaden.

TEN YEARS AGO

From Computer Weekly of November 5, 1970

THE Radio and Space Research Station at Datchet, Bucks, installed an ICL 1904A to aid space research . . . Two models were added to the IBM System 3 range: the Model 6 to which a video terminal could be attached, and the Model 10 which was disc and punched card based . . . British Railways finished installing a computer controlled train describer system at Healey Mills, near Wakefield, an area crossed by the principal east-west rail links of its Eastern Region. It was based on Elliott 905 and 903 kit . . . BR also placed a £6 million order for signalling its West Coast route with AEI-General Signal. The system would be controlled by dual March 9050 machines . . . The government was considering the problems of selling computer kit to Comecon countries, Parliamentary Under-Secretary Anthony Royle said.

B4, 61A moves to F3, 115

...or if you haven't got a pocket edition of the current Geographers' A to Z of London with you: Dorset House, Stamford Street, S.E.1, moves to Quadrant House in Sutton, Surrey

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This is only one way in which we hope our move will be of benefit, not simply to us, but to everyone who has been used to contacting us at Dorset House, Stamford Street, S.E.1.

We look forward to seeing or hearing from you at our new address, so please make a note in your diary now.

COMPUTER WEEKLY moves on 10 November 1980 to Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS
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Starlink kit for UK astronomers

SCIENCE Minister Neil Macfarlane last week inaugurated the Science Research Council's Starlink network of six Digital Equipment VAX-11/780s, designed to provide image processing and data reduction facilities for UK astronomers. He described the kit as putting the UK in the vanguard of progress in this area.

The system enables digitised images taken from a variety of optical and radio telescopes around the world to be displayed in colour on raster graphics terminals and manipulated interactively using a command language developed by the support team based at Rutherford Laboratory. The graphics terminals have a resolution of 512 × 512 picture points and are made by Sigma Electronic Systems of Horsham, Sussex.

The network connects the Rutherford centre with the five other VAXs in Herstmonceux, Edinburgh, Cambridge, Manchester and London to enable software and documentation to be exchanged so that duplication of effort can be minimised and compatibility maintained. Image data is physically transported on tapes because there is so much of it and the links only run at 9,600 bps.

Approval for the £1.8 million Starlink project was given by the Department of Education and Science in October last year, after a year of planning by a committee of four astronomers and two computer scientists. Professor Mike Disney of University College, Cardiff, a leading protagonist for Starlink, said that the importance of inter-disciplinary committees had been shown during World War II. Although committees were good fathers for new projects, he added, they were rotten mothers and so Rutherford with its systems experience had been chosen to mother Starlink.

Savings

Much money would be saved by implementing Starlink rather than providing a mini for every team of astronomers in the UK to do its image processing on. It would not only allow astronomers to get on with their jobs rather than spending their time being second-rate computer programmers, but it would speed up the rate at which astronomy was done. The current rate was three weeks to prepare, three nights to observe and three months to analyse. Major discoveries could be expected from users in the next 10 years.

Professor Malcolm Longair, Astronomer Royal for Scotland and director of Edinburgh Observatory, pointed out that in 1984 the Space Shuttle would put up a space telescope which would see stars up to 10 times further away than present ground-based telescopes could. Starlink was exactly the sort of back-up needed.

In the next 10 years Starlink would be linked to nodes in Australia, Europe and more universities in the UK. Enhancements such as satellite links to remote telescopes and video disc storage of images would be added. And it would be tied in to the general Science Research Council network, to provide access to archives, batch processing and theoretical astrophysical programs.

DECnet communications protocols are currently used to link the VAXs, but sometime next year X25 is to be implemented. Other standards are to be used wherever possible, as are accepted software systems such as the Numerical Algorithms Group mathematical library, the device independent Graphics Kernel System and the Flexible Image Transport System.

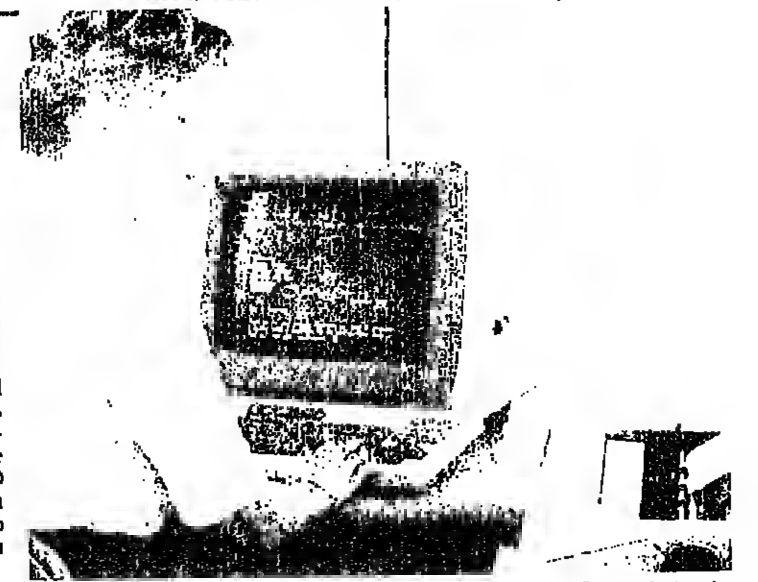
Dr Godfrey Stafford, director general of the SRC's Rutherford and Appleton Laboratories, said that even the captains of industry on ACARD, the government Advisory Council for Applied Research and Development which vetted the expenditure on Starlink, had been happy with the level of investment.

Nexos' WP to cost £7,500

THE first original product from Nexos, the 2200 word processor previewed at Hanover Fair, has now been officially launched with a price tag of £7,500 and the claim from managing director Muir Moffat that it was "taking us forward into office communications systems." Communications software is not yet available but will be provided for Teletype and 2780 working in the first half of next year, and a commitment to support Teletex has also been made.

Functionally, the machine (shown right) is the same as demonstrated at Hanover (CW, June 12 and July 10) but records processing facilities for such work as information retrieval and producing selected mail shots have been announced, for release in the near future. The editing features of the basic machine are notable for their ability to manipulate tables, strings and blocks of text.

The £7,500 price is rather more than had been expected; the increase is put down to inflation. Quantity discounts are to be offered.



A leasing price of £38 a week is being made available through a new firm, Nexos Leasing, which has been set up with bank capital, not drawing on Nexos's National Enterprise Board funding.

The 2200, using the Intel 8086 16-bit micro, is designed to act as a terminal on Nexos's office communications systems when they eventually arrive. The 256K of memory available will be useful for the communications software. The present software occupies about 128K; a separate system disc has to be loaded for records processing.

Moffat expounded his view of the Office of the Future being introduced into companies in easy stages, each stage being cost-justifiable in itself. "You can't have an overnight revolution in the communications systems or organisations," he said. He asserted that the Delta PBX that Nexos is to sell as the centre of its OOF system will be cost-justifiable even in its initial installation as a replacement exchange without word processing. Expensive as it is, he said, it could pay for itself by saving 50 pence per person per day through its telephone answering facilities (CW, January 31).

Bell Labs' Unix finds more micro users

THE lastest version of the Bell Laboratories time sharing operating system, Unix, was featured by two 16-bit microcomputer systems at the *Mini/Micro 80* exhibition and conference in San Francisco last month and should be available on many more micros very soon.

Microprocessor software specialist, Microsoft, said that it planned to implement Xenix, its implementation of Unix Version 7, on as many microcomputers as it could, with current plans being one machine every month.

The two firms demonstrating Unix Version 7 were Onyx Systems and TriData, the latter running Microsoft's Xenix on the SST, a machine based on the 16-bit Zilog Z8001 with a 16 megabyte addressing range.

The US price for a single user TriData system is $15,000, while the C8000 system being demonstrated by Onyx was priced at $12,500 for three users.

Unix Version 7 has been rewritten from scratch in Motorola 6809 assembly language by Technical Systems Consultants of Indiana to create a system called Uniflex for the 16-bit machines sold by South-West Technical Products.

Unix is already used widely on Digital Equipment PDP-11 minicomputers, particularly in academic institutions and now enjoys the distinction of being adopted by Amdahl (CW, October 2). The system was discussed at length in Software File last week, including the commercial Unix users' group just set up in California.

The *Mini/Micro* show is an annual event, the next being held from November 2-4 at the Anaheim Convention Centre, the location of this year's National Computing Conference. Information about the event can be obtained from *Mini/Micro 81*, 32302 Camino Capistrano, Suite 202, San Juan, Capistrano, California 92675, USA.

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SOFTWARE FILE SPECIAL

THIS week Programmers Page and Software File combine to take a close look at something that will profoundly affect the areas they deal with: Ada, the new high level language from the Pentagon.

Ada seems to have been lurking "just around the corner" for a long time. Now its arrival really is imminent and interest in it is hotting up, as attested by the formation of two consortia, Auguste and the "3S" group, in which UK companies have allied to meet the expected rush of Ada contracts.

For a language that has been the subject of so much speculation, solid facts about grammar and syntax have been hard to come by. Now, on the eve of a major conference on the impact of Ada to be held next Tuesday at the Royal Institute of Architects, Dr Brian Wichmann gives Computer Weekly readers a preview of what the language will actually look like and how it will work.

Wichmann, of the National Physical Laboratory, is chairman of Ada-Europe and, as a world authority on high level languages, has been the consultant to the design team.

Dr Wichmann

How Ada will cut cost of producing large-scale systems

Lady Ada Lovelace, Byron's daughter, is credited with being the world's first computer programmer. She is said to have assisted Charles Babbage with his counting engine.

THE Ada programming language has been designed for the US Defence Department with the UK playing an important part in its development.

Though aimed at real time systems, the impact of the language could be much greater since Ada is a general purpose language which has considerable advantages in many areas.

It is recognised that the development of software systems is non-linear. That is: the cost of producing large systems is often more than that of its constituent parts. The reason is the additional cost of designing the interfaces between the sub-systems and integration (and testing) of the total system.

Current programming languages are poor in this "programming in the large" because the large scale design concepts cannot be expressed in the language.

Compatible

In some systems, one cannot even guarantee that components of a system are compatible on integration. For instance, with Fortran, most systems do not object to a routine being called with an incorrect number of parameters or with integer rather than floating point parameters.

The Ada programming language overcomes these problems by requiring that all interfaces between Ada components are specified in the language.

Implementations are required to check the compatibility of these interfaces – indeed such checking cannot be avoided since there is only one such specification. The critical Ada component which is used to break down systems into manageable proportions is the "package".

The package usually comes in two parts: the specification and the body. The body is effectively the implementation of the specification. The parts are quite separate, the link being the name (which is the same). The specification must be provided first, and can be compiled in isolation.

Hence with a large system with many specifications, compile-time checks can be made at an early stage to detect at least some inconsistencies.

The major reason for making the specification separate is that the body can be changed to incorporate some improvement or remove a bug with the assurance that the interface is the same – a fact checked by the compiler.

Examples

To consider the impact of Ada packages further, a series of simple examples are presented. It must be admitted that these examples are much simpler than the real world, but nevertheless they indicate how Ada should work in practice.

In this first example, consider a graphics package which must record the status of the pen during the plotting. The essential data consists of a value which is true if the pen is up, and false if it is down, the rest of the data being the co-ordinates of the pen. In Ada, this is written as:

```
package PLOTTING_STATUS is
   PEN_UP: BOOLEAN;
   X_POS, Y_POS: REAL;
end PLOTTING_STATUS;
```

This is the specification of the package, which in this case completes the package. A compiler can compile this as a complete program unit which will then allow its use within other procedures and packages.

In fact the user needs to place in front of the program unit the clause:

```
with PLOTTING_STATUS;
```

Then the components of the package can be referenced as:

```
PLOTTING_STATUS. PEN_UP
```

or

```
PLOTTING_STATUS. X_POS
```

etc.

However, in many contexts the repeated reference to the package name is unnecessary and clutters the text. Hence a programmer has the option to write in the program:

```
use PLOTTING_STATUS;
```

so that subsequently the variables PEN_UP etc can be referenced directly.

Note there is only one specification. The user need only state the name of the package to obtain access to all the components of the package.

The compiler grants this access by consulting the compiled version of the specification. No textual substitution is involved, eliminating the possibility of the text being different when it should be identical.

Of course, one can achieve the same effect as this simple example in Fortran by using a named COMMON block. The important difference is that in Fortran the entire specification must be repeated and any error will not be detected by the compiler. The Ada brick facility of RTL/2 does provide what is required but cannot handle the generality of the Ada example.

Timetabling

In Example 2, we consider timetabling problem. In this context there are a large number of terms in everyday use which are not available in programming languages.

Ada meets this need in three ways as Pascal by permitting the programmer to declare new types which correspond to the application vocabulary.

All of these terms can be placed in a single package so that the programmer can extend his vocabulary by a single "with" clause.

In this case, our example could be:

```
package WORK_DATA is
   type DAY is (MON, TUE, WED,
      THU, FRI, SAT, SUN);
   type HOURS_SPENT is delta
      0.01 range 0.0 .. 24.0
   type TIME_TABLE is array
      (DAY) of HOURS_SPENT;

   WORK_HOURS: TIME_TABLE :=
   NORMAL_HOURS: constant
      TIME_TABLE :=
      (MON .. THU => 8.25
       FRI => 7.0,
       SAT/SUN => 0.0);
end WORK_DATA;
```

The type DAY is an example of an enumerated type where variables of the type can only have the values MON, TUE etc. The advantage of such types is that one avoids "magic" numbers where 0 means Monday.

The type HOURS_SPENT is an example of the approximate type where values are stored to within 0.01 of an hour.

The array type TIME_TABLE can now be specified which gives a weekly record. Two weekly

● Turn to page 7

Puzzler

SIX
SEVEN
SEVEN+
TWENTY

THIS "true" alphametic involves nine of the 10 digits from 0 to 9, and has only one solution on page 37.

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by Dr Brian Wichmann

Component interfaces are specified by the language

● From page 6

records are given, one as a variable and the other constant. The constant is given an initial value by specifying that Monday to Thursday will be 8¼ hours, Friday 7 hours and Saturday and Sunday nothing.

The advantages of such a package are now apparent. Users can declare variables of type DAY, write procedures having parameters of type TIME_TABLE etc. Moreover, all these interfaces are checked by the compiler, for instance, a statement such as D := 1; (D is a DAY) and WORK_HOURS (1) := 2; are rejected although their equivalent would be permitted in lower level languages.

Although this example is more extensive, it still lacks a body which is needed for our next example.

Executable

In Example 3, we consider a case which requires some executable code as well as types and data. This is a rational arithmetic package. Again, it is hardly a comprehensive example but merely sufficient to illustrate the ideas.

The specification of the package is as follows:

```
package RATIONAL_NUMBERS is
   type RATIONAL is record
      NUMERATOR: INTEGER;
      DENOMINATOR: INTEGER
      range 1 .. INTEGER'LAST;
   end record;
   function EQUAL (X, Y:
      RATIONAL) return BOOLEAN;
   function "+" (X, Y: RATIONAL)
      return RATIONAL;
   function "*" (X, Y: RATIONAL)
      return RATIONAL;
end RATIONAL_NUMBERS;
```

The type RATIONAL is used to hold basic values for the package and its users. It consists of a pair of values, both INTEGER, but with the second being strictly positive.

The user can now declare HALF: RATIONAL := (1, 2);

The functions EQUAL "+", and "*" are provided as part of the package and represent operations on the type RATIONAL, presumably coded to provide the conventional meaning.

Only the specification of these functions is provided in the package specification.

The body of the functions is to be found in the separate package body, which could be:

```
package body
   RATIONAL_NUMBERS is
   procedure
   SAME_DENOMINATOR
   (X, Y: in out RATIONAL) is
   begin
      -- reduces X and Y to the
      --same denominator
   end;

function EQUAL (X, Y:
   RATIONAL) return BOOLEAN is
   U, V: RATIONAL;
begin
      U := X;
      V := Y;
      SAME_DENOMINATOR (U,
      V);
      return U.NUMERATOR =
         V.NUMERATOR
end EQUAL;

function "+" (X, Y: RATIONAL)
   return RATIONAL is
begin
   -----
end;
function "*" (X, Y: RATIONAL)
   return RATIONAL is
begin
   -----
end;

end RATIONAL_NUMBERS;
```

The user of the package requests the package by the usual "with RATIONAL_NUMBERS;", and then can declare variables of type RATIONAL, call EQUAL etc.

The operations "+" and "*" are called in the conventional way as infix operators:

```
-- User's program skeleton
with RATIONAL_NUMBERS;
procedure USER_PROGRAM is
--
-- some declarations
R, S: RATIONAL;
--
R := (3, 5);
S := (1, J);
if EQUAL(R, S) then
   --
end if;
R := R + S; -- RATIONAL
-- addition
end USER_PROGRAM;
--
```

Hidden

The importance of the separation of the package body can now be illustrated. The procedure SAME_DENOMINATOR is local to the body and in consequence is not visible to the user.

By this simple means, internal details can be hidden from the user. The package body can be recompiled at any time without recompiling the uses of the package. Hence enhancements which do not change the specification can easily be made, for instance the package could be modified to monitor the calls made of the individual functions.

One can see from this that the design of the specification becomes a key function in the system design. These specifications should also be small enough for senior staff to write themselves, thus enabling them to delegate the major work of writing the packages to more junior staff with confidence.

Ada packages also permit the system designers to specify data types whose details are hidden from the users in the same way that procedure and function bodies are hidden. This is illustrated in the final example.

Private

In Example 4, files are important data objects whose internal characteristics depend heavily upon the particular machine being used. In consequence, in many languages, files are a basic data type which have properties which cannot be specified in the language itself.

In contrast, Ada uses the package mechanism to specify files as a data type whose implementation is hidden from the user, but not the compiler.

The details of the "private" type must be included in the specification otherwise a compiler could not compile the user's code with credible efficiency. The resulting package specification becomes:

```
package I_O_PACKAGE is
   type FILE_NAME is limited
      private;
   procedure OPEN( F: in out
      FILE NAME);
   procedure CLOSE( F: in out
      FILE NAME);
   procedure READ( F: in out
      FILE NAME; ITEM:
      in INTEGER);
   procedure WRITE( F: in out
      FILE NAME; ITEM:
      out INTEGER);
private
   type FILE_NAME is
   record
      INTERNAL_NAME : INTEGER
      := 0;
   end record;
end I_O_PACKAGE;
```

```
package body I_O_PACKAGE is
   LIMIT: constant = 200;
   type FILE_DESCRIPTOR is record
      ----
      end record;
   DIRECTORY: array (1 .. LIMIT) of FILE DESCRIPTOR;
   -----
   procedure OPEN (F: in out FILE_NAME) is
      begin
      ----
      end;
   procedure CLOSE (F: in out FILE_NAME) is
      begin
      -----
      end;
   procedure READ( F: in out FILE_NAME; ITEM: out INTEGER) is
      begin
      ----
      end;
   procedure WRITE( F: in out FILE_NAME; ITEM: in INTEGER) is
      begin
      ----
      end;
begin
   --- initialisation code
end I_O_PACKAGE;
```

Figure 1

The "limited private" means that the user can only declare variables of this type and pass them as parameters to the provided procedures. Hence the user cannot even copy the values, a restriction which is essential if security is required for files. The package body might be as in Figure 1 above.

The advantage of hiding more details from the user is clear. The user is less confused with extraneous details and the writers of the package have greater freedom to change the implementation.

Private types are a very useful weapon which, for instance, enables the system designer to isolate machine dependent types without a resulting loss of efficiency.

Production of quality compilers expected by 1983

ONE problem with Ada is that production quality compilers will not be generally available until 1983. Those who would like comprehensive tools with the compiler may have to wait until 1985, especially if they are required on machines that are themselves not widely available.

It might seem that Ada can have little role to play in software construction for a few years yet. Conversely, one can say that Ada has an important part to play now, and that this is the right time for industry to brief itself of the potential of Ada.

Simple

It is a matter of simple arithmetic that the largest single cost of Ada is training programmers to use it effectively. As the examples of the use of packages shows, there is little point in using Ada just like traditional languages – its contribution to programming in the large must be exploited.

If one is considering the design of a large real time system now, then Ada could play an important part. The system design can be written as Ada packages providing a communication tool for the designers. Simple text processing tools can be used to process these specifications to aid the designers in their understanding of the total system.

Given the Ada design, this can be translated by hand into the implementation language of the project – Coral 66 or RTL/2, for instance. With long-term projects, it may be possible to translate the designs directly when Ada compilers become available.

At the very least, such a process will substantially aid the transfer of staff to the use of Ada, in this case starting with the crucial system designers.

It is important to note that this proposal does not replace the design methodologies of Jackson *et al*, but merely provides a mechanism to give substance to the designs.

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MICRO NEWS by Eileen Stainer

Japan effervesces with magnetic bubble plans

MAGNETIC bubble technology is here to stay. Several semiconductor companies, both in the US and Japan, are now tackling the problems associated with the launching of bubble memory systems, like the emergence of an industry standard bubble subsystem architecture and the development and availability of suitable cost-effective controllers.

Dr Peter Walker of Mackintosh Consultants, having attended the fourth International Conference on Magnetic Bubbles in Tokyo last month, reports on the progress of magnetic bubble technology in Japan.

Japan has demonstrated a clear commitment to make bubble technology work, with at least four companies having an extensive production capability as well as R&D. Hitachi, having shipped 64K bit chips for a number of years, is now supplying 256K bit devices which are being used by NTT in a transportable electronic switching system. The 64M bit magnetic bubble memory system developed by NTT is now replacing drum memory and is used to control a 10,000 line emergency exchange.

NEC sees many applications for bubble memories in the merging area of computers and communications and is now manufacturing 256K bit devices with the 1M bit scheduled for 1981. Such devices are being used in an experimental one megabyte audio response system and are expected to find increasing applications in telecommunication equipment.

Imaginative

Perhaps the most imaginative approach has been taken by Fujitsu with the development and shipment of magnetic bubble cassettes. Although not cost-competitive with tape cassettes, the magnetic bubble cassettes may be used in hostile environments subjected to vibration and atmospheric pollution.

Existing applications demonstrated include program loading into numerically controlled machine tools, word processing applications and terminals in which the cassette plugs directly into the keyboard and general data logging. The original 8K byte cassette has been followed by the 32K byte and a family of 256K, 512K and 1M bit chips have now been developed for a range of 128K byte cassettes.

Using a parallel organisation of 128K bit chips, NEC has developed and demonstrated a one megabyte bubble memory system for use in voice responsive systems.

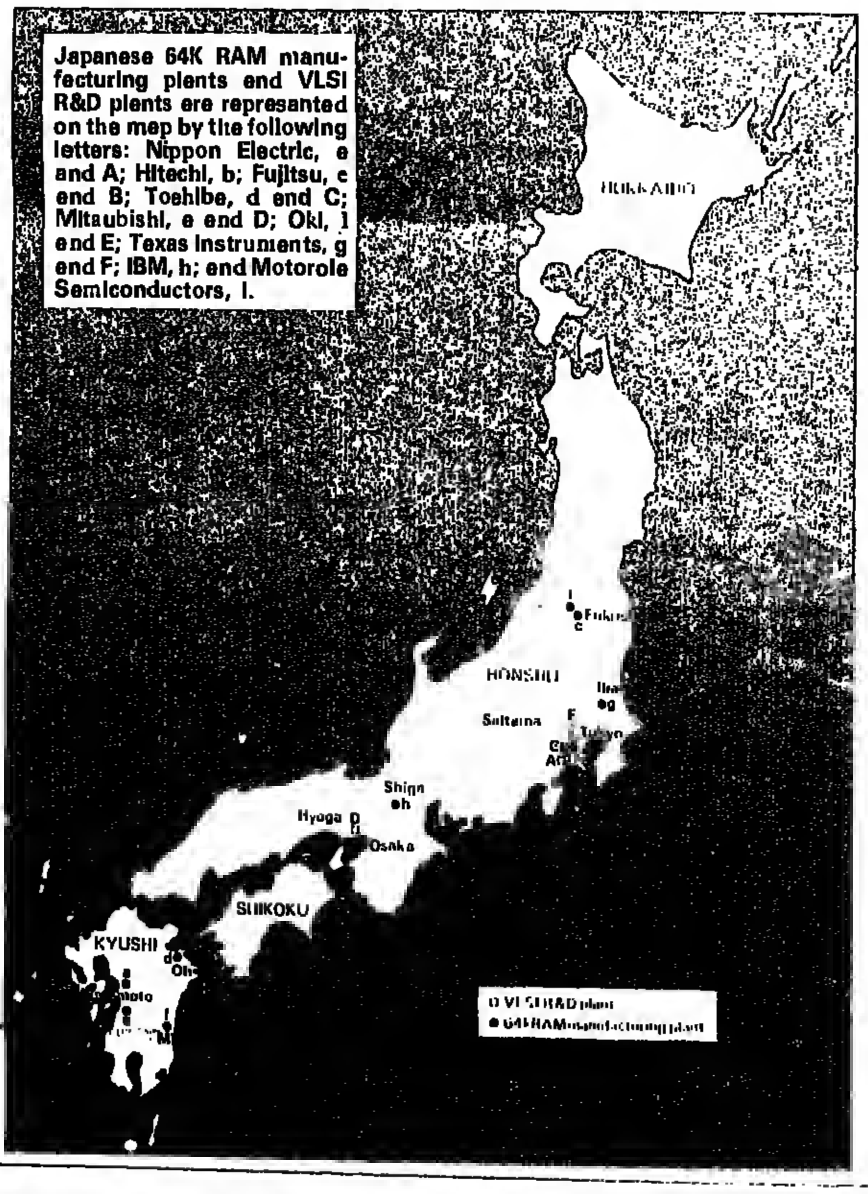
The government-funded Electrotechnical Laboratory has demonstrated the operation of the 8M byte magnetic bubble memory system for use in the database machine developed for the Pattern Information and Processing Scheme (PIPS).

The 1M bit bubble memory chips are now reaching an advanced stage of development, with simple devices expected to be available from a number of sources during the next two years. These include NTT, Fujitsu, NEC and Hitachi in Japan, and Rockwell, Intel, TI, Motorola and National in the US.

Having characterised the prototype 1M bit devices, these companies are now optimising the details of the microfabrication processes used to produce and delineate the multilayer structure and are striving to achieve the required production yields. Results presented in Tokyo indicate that bubble devices have a better reliability than electromechanical memories and are capable of error-free operation equivalent to that of semiconductor RAMs.

As shipment values increase and the bubble devices move down the traditional learning curve, the price will fall until it reaches 30 millicents/bit, estimated to be by 1983. The emergence of an industry standard magnetic bubble device specification and architecture together with second-sourcing will help this process.

In the meantime, IBM, AT&T (Bell Labs) and the Japanese companies continue to pursue the development of ion-implanted propagation patterns as the most promising technique for the achievement of even higher packing densities and chip capacities.



Japanese 64K RAM manufacturing plants and VLSI R&D plants are represented on the map by the following letters: Nippon Electric, a and A; Hitachi, b; Fujitsu, c and B; Toshiba, d and C; Mitsubishi, e and D; Oki, f and E; Texas Instruments, g and F; IBM, h; and Motorola Semiconductors, i.

Black Box III offers network facilities

MULTI-USER, multi-... networking seems to be the ... Rair with the introduction of ... Black Box III range of micro-computer systems. The four mo... will be able to run the C... single-user operating system, ... MP/M multi-user equivalent ... the CP/NET networking sy... from US systems house Digital Research.

All four models comprise ... RAM, as in the previous m... but this time it is expandable ... half a megabyte. An incorpo... memory management unit co... the addressing by the use of ... ping registers.

The 3/10, priced at ... £2,000, has single floppy disc ... support providing 1 Mbyte ... memory and dual serial ou... With add-on Winchester ... drive, expanded memory, ... VDUs and two printers it can be... come a multi-user system for be... tween £10,000 and £12,000.

Models 3/20 and 3/30 have ... floppy discs and built-in 5¼-... Winchester discs from Shug... providing an extra 6 Mbytes ... memory. A 3/20 system with ... the dual floppy discs costs £2,... while the 3/30 with a single flop... disc and single 5¼-inch disc ... around £3,500. Both will do ... as stand-alone single user system... with one VDU and printer ... £4,000 to £6,000.

The 3/40 model, when used ... an eight-inch Winchester disc, ... be configured in a multi-compu... network. The system, with ... eight-inch disc, costs about ... and each add-on disc is ... £2,500, providing an ext... Mbytes of storage per disc. Up... eight Winchester discs can be con... nected.

OP SPOT by Paul Fisher

'A Royal College of Ops is what we need'

AMONG the reasons given for the lack of both a career structure and a set of recognised qualifications for operators is that operations is a young and low-status trade in a young and volatile industry. The argument has it that it is therefore inappropriate, even pretentious, to impose standards.

Ian Cheeseman disagrees with this kind of thinking and says: "This is not a young industry, just a disorganised one."

Cheeseman has a number of ideas on how the operations side of computing should be organised. These hinge on the notion of forming a professional body exclusively for operators.

He has none too high an opinion of the British Computer Society, and says: "The BCS is geared to programming and analysis and treats ops staff as dogsbodies." He would be happier seeing such a professional body hanging on the tails of the IDPM, but ideally he would like it to be independent.

"I'd like to see it work on the lines of the Royal College of Nursing. This is a well-respected organisation representing the working section of the Health Service."

Status

Cheeseman makes what seems an odd comparison between nurses and operators. "Both groups of workers," he says, "are involved in the doing rather than the thinking parts of their trades. Both have traditionally been paid less and given less status than their more exalted colleagues. The major difference is that nurses don't operate."

In this context it is worth sketching the role of the Royal College of Nursing: It splits its activities into three categories: to boost the nursing profession, to handle labour relations and to promote higher educational standards within the profession.

Formed in 1916, it has a role in advising government and generally protecting the interests of its members and the patients. Since 1977 it has been certificated as a trade union although, as Cheeseman points out, nurses are at liberty to belong to another union. In fact about one-third of all nurses, some 170,000, belong to the union.

The last part of the College's activities is that of promoting further education, although the General Nursing Council handles the SEN and SRN qualifications. Cheeseman is in favour of training courses for ops followed by examinations, and would like to see them administered by the professional body.

"Training," says Cheeseman, "is a disgusting aspect of the scene. It's about time the industry realised that it must invest in training." He thinks that employers should allow more day release and involve themselves in structuring courses and providing lecturers.

Pattern

He envisages a two-year training period for operators similar to old-style craft apprenticeships. The training would be divided more or less equally between the machine room and the classroom. Initially the trainee would get some hands-on experience to be consolidated in the class, a pattern which would be repeated throughout the training.

There are, of course, any number of topics which could be covered: the theory of telecommunications, networking, virtual storage, what 450K-bytes per second means, etc.

In Cheeseman's ideal world such a course would culminate in a pair of examinations covering the practical and the theoretical aspects of operating. He feels that as operations is becoming increasingly technical and as operating systems are becoming more similar, an examination for all operators could easily be devised.

Cheeseman reckons that a recognised qualification would bring several advantages. It would give dignity and cohesion to what is still perceived as a marginal trade. It would stop failed programmers turning to operations work and it would allow employers to judge the abilities of an applicant.

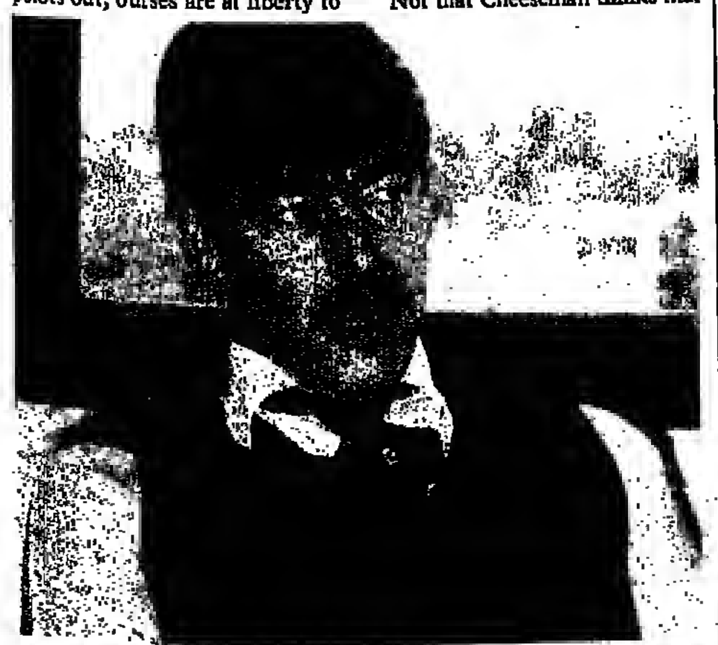
All in all, it would amount to a jump in the status of the operator.

Not that Cheeseman thinks that operators have any reason to feel inferior. "If all ops stopped working tomorrow," he says, "the country would fall apart . . . the country relies on a class of people who are insulted and denigrated by the people they work for. We all know the old story of operators being like mushrooms. They're kept in the dark and a bucket of manure is thrown over them every now and then."

The introduction of examinations backed by an Institute for Operators would also tend to allow a recognised grading structure to emerge. At the moment a shift leader, for instance, means anyone from the boss of a bunch of ops at a large installation to the person who is lording it over his mate because he joined the company three weeks earlier.

As ops grow more specialised staff will be identified by job function rather than job title. The identification by job function is the approach that Infotech has started to take when filling up its courses.

Cheeseman readily admits that on paper his qualifications are minimal, but he has been in the trade long enough to be confident of his skills. He started in ops in 1970 and after seven years did a stint as a contractor. He was recently appointed superintendent of computer operations with an insurance company and is working for the ACII insurance exams.


IAN CHEESEMAN . . . "If all ops stopped work tomorrow the country would fall apart".

No withdrawal problem

I HEAR that the problem of nicotine-withdrawal in the computer room has been overcome at one site by the old habit of snuff-taking.

The operators nip behind the tape decks for a swift sniff and partially satisfy their craving for a fag. There are no tell-tale plumes of smoke or sprinklers drenching the computer to give the game away. The odd violent sneeze and a runny nose provide the only evidence of this secret vice.

I was also told that operator's pay doesn't stretch to cover the purchase of more powerful and exotic powders.

Ups and downs forecast for 1980s

THE problem with predicting is that the predictions are usually either vague or wrong.

Palmists, astrologers and tarot artistes aren't all that good at telling you anything concrete. You might be told that you have artistic inclinations and a down-to-earth mind and that you are a cheerful companion although subject to fits of depression — but you probably knew that already.

Deductions from statistics aren't that much help either. A couple of recent surveys make possible the confident prediction that the 1980s will be both a bright and a gloomy period for operators.

The good news comes from the Lock Management Personnel Group's autumn report on salaries in the South and South-East England (excluding central London).

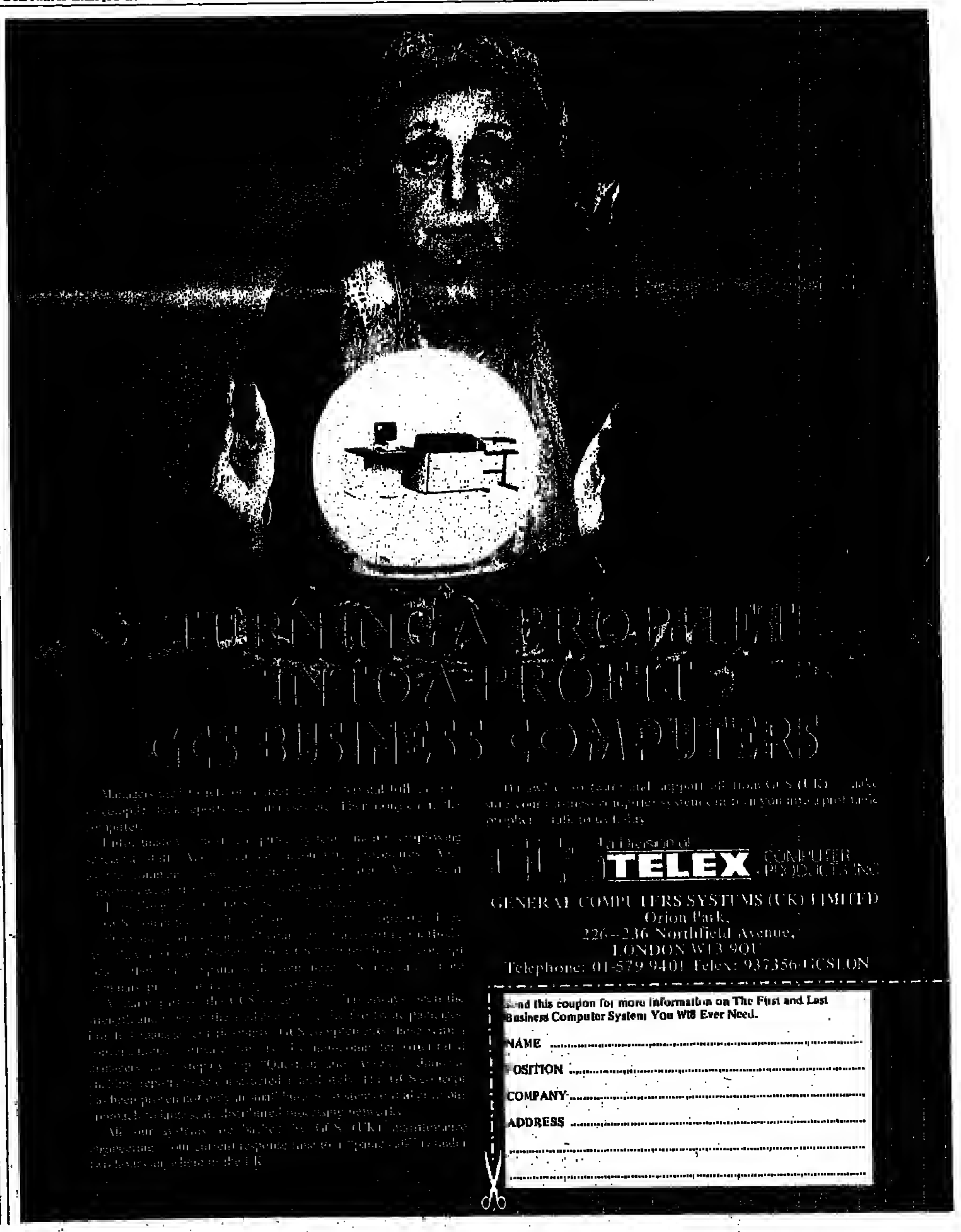
It says: "Operations staff's salaries generally have moved up by between 20% and 30%. Operators are up by 25% but trainee operators by 50% to 60%, presumably in an attempt to attract more people to the job."

Before you start congratulating yourself on having mounted such a glittering bandwagon, consider the gloomy news from an Urwick Computing report which aimed to forecast the next 12 months' staff requirements. As at June 1980 this indicated that 10% of installations intended to increase employment for operators and data entry staff; 64% of the installations surveyed reckoned that their requirement would remain the same, and the other 26% expected to decrease ops staff.

SMAC in the ICL

THERE is a power supply failure in the SMAC unit of an ICL 2900. Call the engineer? Pop down to the local for a swift half? Go home?

One dedicated op found the perfect solution at his 2900 installation when the warning lights started to flash. A hefty whack of the time switch in the SMAC solved all the problems and everything was running smoothly before anyone had noticed anything was wrong.



COMPANY NEWS

Guide to raising risk capital

FINANCE hungry young companies could be interested in a slim but free booklet* published by Harvard Securities outlining the ins and outs of over-the-counter market flotations for raising long-term risk capital. It is essentially designed to promote security dealer Harvard's own services.

Harvard says that it has spent two years researching and preparing over-the-counter flotations. Factors looked into include the criteria which a company should satisfy in order to be considered for a potential flotation, the vetting procedure and stages leading to the preparation of a prospectus, the actual flotation, the floated company's responsibilities after the flotation and the "making of the market" in a company's shares.

So far Harvard has only completed two over-the-counter flotations but the company points out that at least two-thirds of the 27 companies that have seriously considered a flotation have been firms with products and/or services in the information technology industries.

Harvard says that it acquired considerable practical experience of financing and managing such a company when it provided a microprocessor software and systems designer, Hyperon of Brighton, with £70,000 development finance in January 1979. There was a longer-term view to eventual over-the-counter flotation but in the event Harvard sold its interest in Hyperon to Racal in June last year.

In August 1978 Harvard retained Dr Stephen Castell to help in the design of over-the-counter schemes. Dr Castell, a former merchant banker, set up a company, Castell Computer and Systems Telecommunications, about two years ago to set on behalf of security dealers (CW, November 9, 1979).

*Equity Finance for Young Growth Companies. Clive Lawrence, Harvard Securities Ltd, York House, Westminster Bridge Road, London SE1 7UT. Tel: 01-928 8691.

Univac turnover up 12%

UNIVAC'S parent company, Sperry Corp, grew faster as a whole than its computer division in the second quarter of the company's current financial year. Univac's turnover was 12% up on the same period last year, while total Sperry Corp turnover saw an increase of more than 15%, from $1.1 billion to $1.27 billion.

Sperry chairman, Paul Lyet, considered that Univac performed well in the second quarter and predicted that it would perform even better in the second half of fiscal 1981.

But the star performers at the moment are the aerospace and defence sides of Sperry's business, represented by the Sperry Division and Sperry Flight Systems. They grew by 39% and 48%, respectively.

Sperry Corp net profits increased 15% to $77 million.

Zygal buys UK arm of Telefile

TALKS between the UK firm, Zygal Dynamics, and Telefile Computer Products Inc, about a takeover by Zygal of Telefile's UK subsidiary (CW, April 10) have reached the stage of an agreement in principle. The deal between Zygal and the Irvine, California, manufacturer of Xerox Sigma compatible kit is expected to be completed this month.

Zygal was set up in December 1975 by Con Driscoll and John McLean from the defunct Rank Xerox Data Systems and a major part of its business has been selling printers and terminals built by Xerox subsidiary, Diablo.

Because of the Xerox background, Zygal was hired to set up Telefile Ltd in early 1976 by the US parent and has managed the UK company ever since on behalf of Telefile Inc. Now Zygal is paying Telefile Inc an undisclosed sum to take over all the assets of Telefile Ltd, including its 15 staff. Most of them are engineers maintaining Sigma machines and associated equipment in the UK not serviced by Honeywell, the firm that took over the Sigma user base worldwide in 1975.

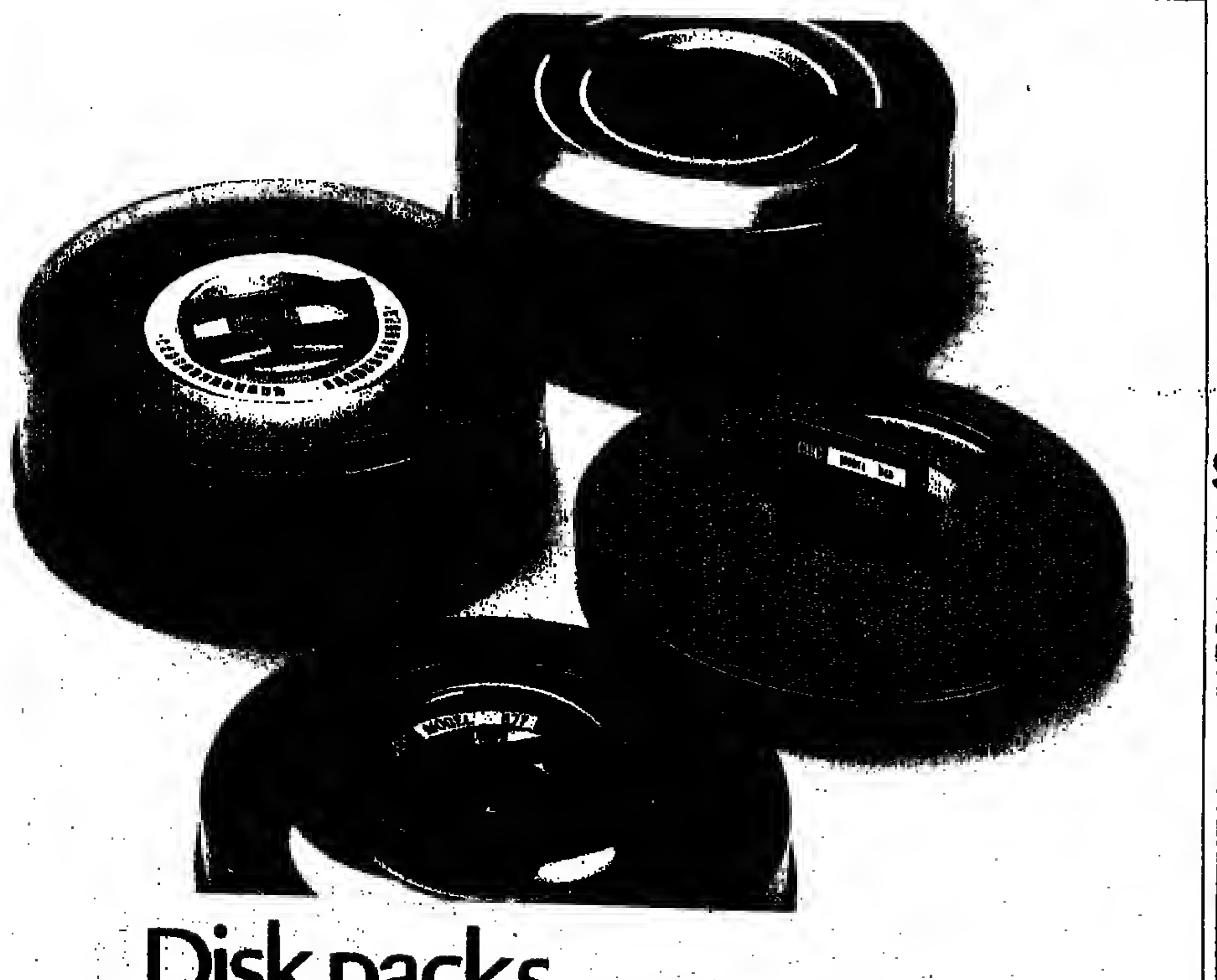
Zygal is also acquiring the name, Telefile, but not the firm itself, which will continue to exist under a different name as a shell company. This is because the UK firm also owns the Telefile company in West Germany which the US parent is retaining. Telefile Inc will now take over management of the West German firm from Zygal which set it up and has run it along the same lines as Telefile Ltd.

According to Zygal, Telefile Inc decided to sell the UK operation because of the financial difficulties created by the cost of developing the T-85, its plug-compatible replacement for the Sigma 9 (CW, June 19). Telefile Inc made a loss in its financial year ended September 30, 1979, as a result of T-85 development costs. Its results for its last fiscal year just ended have yet to be announced.

Zygal's main reason for acquiring the assets of Telefile Ltd is the continuing maintenance revenues generated by the company.

They should contribute up to £800,000 to Zygal's projected million revenues over the next months. The Telefile company will become a division of Zygal's Slough-based maintenance company, Zygal Services.

Under its agreement with Telefile Inc, Zygal retains the UK marketing rights to Telefile products, including its Xerox-compatible disc subsystems and the T-85. Apart from offering the T-85 as a much more compact and inexpensive replacement for Xerox Sigma machines, Zygal believes that it could be sold as a direct competitor for 32-bit superminis like the Digital Equipment VAX 11/780.



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Japanese firms do well

TWO of the biggest Japanese-owned computer manufacturers, Fujitsu and Nippon Electric, have published financial results for the first half, ended September 30, of their current financial years.

At Fujitsu, overall turnover increased by only 2.4%, mainly because of a big falling off in sales of telecommunications kit to the publicly owned Nippon Telephone and Telegraph. But sales of computers and data communications equipment increased by 20% to account for more than 65% of the $1,310 million total.

Net profits at Fujitsu saw a healthy 34.4% increase to about $[illegible] million, while exports moved up by 14.5%.

At Nippon Electric total sales in the first half rose by 27% to $1,9[illegible] million, while net profits saw a 36% increase to around $36 million. Sales of semiconductor devices jumped by more than 70% to $368 million. Computer systems account for around a quarter of total sales, putting Nippon Electric in fourth place in the Japanese computer market behind Fujitsu, IBM Japan and Hitachi.

Systems house diversifies

PERIPHERALS and terminals from major manufacturers are to be sold by the Peripheral Products Division set up by systems house PRCI (UK), part of the US-based computer services and consultancy group, Planning Research Corp. Based at Nottingham, the division's product line will include printers from Dataproducts, disc drives from Control Data and magnetic tape units from Kennedy International.

Equipment sold by the division will be maintained by PRCI's engineering services division which now has its European headquarters at Nottingham.

CW SHARES TABLE

Date 31/10/80 — Index: 107.27 Change: +0.27

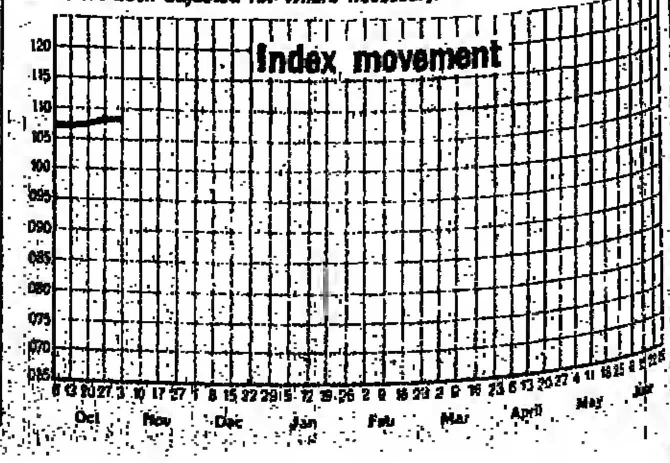
London Stock Exchange

1980 High (pence)	1980 Low (pence)	Stock	Price (pence)	C'nge
615	230	A Comp Tech (25p)	450	+15
96	56	BOC Int (25p)	91	+1
43	25	B Bev Kent (15p)	31	+2
120	85	Chubb (20p)	85	—
106	60	Cole (R.H.) (25p)	60	-6
875	540	De La Rue (25p)	865	-2
180	143	Extel (25p)	165	-1
450	234	Ferranti (50p)	457	-11
671	336	GEC (25p)	671	+15
191	116	ICL (25p)	163	-1
81	64	Kalamazoo (10p)	76	+3
345	203	Kode Int (25p)	333	-2
270	103	Muirhead (25p)	103	-2
357	231	Office & Elect (25p)	327	+4
470	279	Philips Lamp (Fl 10)	328	-17
266	108	Plessey (50p)	266	+1
178	78½	Quest Auto (10p)	170	+3
351	109	Racal Elect (25p)	351	+7
104	65	Rediffusion (25p)	99	-2
374	267	Thorn EMI (25p)	360	+8

US Stocks

1980 High ($)	1980 Low ($)	Stock	Price ($)	C'nge
34½	18⅞	Amdahl	26½	-1½
33⅝	17¾	Ampex	29⅝	+3⅞
51	23¼	Auto Data Pro	47¼	-1⅝
84	61½	Burroughs	61⅞	-3½
27¼	11½	Comp Automation	22½	+1⅝
29½	18⅝	Comp Sciences	18⅞	-⅛
21	11¼	Comshare	[illegible]	[illegible]
75½	45	Control Data	[illegible]	[illegible]
86¾	63⅞	Data General	[illegible]	[illegible]
94½	44⅞	Datapoint	[illegible]	[illegible]
34½	10¼	Dataproducts	[illegible]	[illegible]
84⅝	59½	Digital Equipment	[illegible]	[illegible]
37⅞	18¼	Elec Data Sys	[illegible]	[illegible]
15⅞	6¼	Gen Automation	[illegible]	[illegible]
61½	29¾	Harris	[illegible]	[illegible]
90	63¾	Hewlett-Packard	[illegible]	[illegible]
97⅞	65¼	Honeywell	[illegible]	[illegible]
48	27⅝	Intel	[illegible]	[illegible]
70	63⅞	IBM	[illegible]	[illegible]
29⅞	10⅞	MDS (Mohawk Data)	[illegible]	[illegible]
34½	9⅛	Mangmt Assist	[illegible]	[illegible]
18⅞	11½	Memorex	[illegible]	[illegible]
31¼	23⅞	Modular Comp	[illegible]	[illegible]
70⅞	47¼	Motorola	[illegible]	[illegible]
42½	17¼	National Semi	[illegible]	[illegible]
76¼	53¼	NCR	[illegible]	[illegible]
57½	37	Perkin-Elmer	[illegible]	[illegible]
48¼	14½	Prime	[illegible]	[illegible]
84⅛	63¼	Raytheon	[illegible]	[illegible]
56⅞	47¼	Sperry Corp	[illegible]	[illegible]
23⅞	11⅞	Storage Tech	[illegible]	[illegible]
[illegible]	[illegible]	Tandy	[illegible]	[illegible]
[illegible]	[illegible]	Texas Instruments	[illegible]	[illegible]
78⅞	27⅞	Tymshare	[illegible]	[illegible]
64½	16½	Wang Lab B	[illegible]	[illegible]
19⅛	6¾	Wyly	[illegible]	[illegible]

The table shows the closing prices in London on Friday and in America on Thursday. The share index is based on the prices of the UK companies in the table. Highs and Lows have been adjusted for where necessary.



'All or nothing' EEC programme for micros

ACTION by the EEC on promoting the European computer and telecommunications industries, which has been very slow up to now, should gather a lot more momentum in the next few weeks as new proposals are put to the Council of Ministers, accompanied by dire warnings from their commissioners.

A programme for microelectronics has been presented to the Ministers, and this has been deliberately designed so that its funds cannot be trimmed. It will have to be accepted all or nothing.

Explaining this at the EEC's conference on the subject in London, the EEC's director for high technology, Christopher Layton, made it clear that he wanted no delay similar to that which held up the four-year programme on informatics for almost as long as the programme was to run.

The funds for that programme were also cut to a quarter of those asked, ending up as £15 million.

Confidence

Industry Commissioner Viscount Davignon backed up Layton's point about the urgency of the situation, insisting that "If there haven't been clear signs by next July that we have tackled the issue, people will lose confidence in the exercise." Business leaders would feel it was a waste of time, he said.

Layton described the main problem as the three-year delay between the incorporation of the new technology in American products and its arrival in Europe. The commission is aiming at a target date of 1985 when this delay would be eliminated, by the development of sub-micron technology in Europe that would be able to compete with the US and Japan.

To achieve this the microelectronics programme currently proposes three thrusts of effort, one in computer-aided design and testing for chip production, another in production equipment such as steppers and electron beam lithography gear, and the third on the co-ordinating of national programmes, especially advanced research in the universities.

Subsidy

A total of 100 million accounting units (£60 million) is envisaged as the cost of this at the moment for the next four years. This would come from local or national funds and would then be reimbursed up to 50% from the Community budget. Layton pointed out that this was equivalent to the subsidy the Community was spending on agriculture every half day.

He added that the main problem was not money but political commitment.

Proposals are also being put forward for telecommunications. These comprise: promoting standards for networks and equipment, establishing a community market for terminal equipment by speeding up type-approval procedures and introducing mutual recognition of regulations, and taking "modest steps" towards opening up PTT procurement, at least 10% at first in Layton's view.

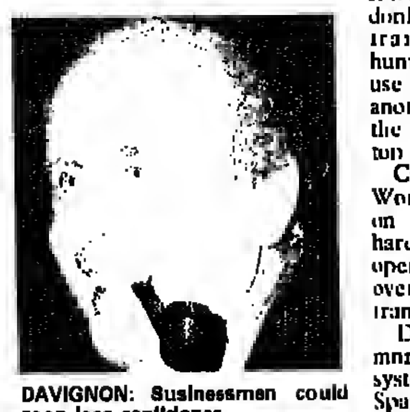
The informatics programme, which has been running for a year now, has the twin objectives of promoting harmonisation and co-operation, and also funding software and applications development. Proposals for applications projects were called for in February and approval for 14 of these is expected within a few weeks. Applications areas that have been considered include transport, customs, and labour exchanges.

Two projects for developing standards for the Ada language are being supported. Layton wants to see a European validation centre set up for Ada compilers.

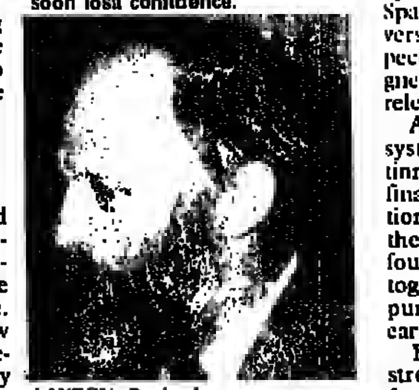
Thorny

He also wants to give aid and support to multinational companies in return for contractual obligations that they upgrade the level of technology in Europe. This raised the thorny issue of how "European companies" are defined. Davignon avoided this by saying that European-owned firms could not be separated, but that he was talking of companies which have real development going on in Europe, and are not just assembling parts.

Layton welcomed the decision by the UK government, as yet unannounced but exclusively revealed in Computer Weekly (CW, October 2), to introduce legislation for data protection. The EEC had decided that the best way to deal with the privacy issue was through the Council of Europe, he said.



DAVIGNON: Businessmen could soon lose confidence.



LAYTON: Designing a programme that cannot be trimmed.

Taking donkey work out of human language translation

A SYSTEM that takes much of the donkey work out of language translation – the type that humans, rather than computers, use to communicate with one another – is being marketed in the UK by London-based Hamilton Rentals.

Called the Weidner Multilingual Word Processor, the system runs on Digital Equipment PDP-11 hardware under the RSX-11M operating system and produced over 20,000 words of "raw" translation in an hour.

Developed by Weidner, a Mormon company in Utah, US, the system is currently available in Spanish to English, English to Spanish and English to French versions. An Arabic version is expected in December, with Portuguese, German and others being released early next year.

According to Weidner, the system has a wide range of applications in such areas as business, finance, government and education. They also see it as useful to the likes of translation bureaux, four or five of which might club together for a system, and for the purpose of manual translation for car manufacturers.

Both Hamilton and Weidner stress that the system is intended for use by, rather than to replace, skilled translators. A translator might, for instance, enter text for processing overnight and use his skills to refine it the next day.

In Canada, the average translator is reckoned to process between 500 and 1,500 words a day and it is claimed that his output would rise to some 4,000 words a day on the Weidner system.

Features of the system include translation of text, amendment, dictionary entries, synonym entries and password protection. The system is menu driven, which means that user is given a list of options at the end of each function.

The user updates his dictionary and synonym files as required and is therefore able to add all the technical and colloquial terms he desires to the system.

A version of the system running on a PDP-11/34 with four translation terminals is available for about £100,000. Established PDP-11 users may buy the software for about £40,000 and rental and leasing terms are also available.

Dealer adds rival software

MICRO dealer BMG Microsystems has added CAP's MicroCobol to its software range for the MS5000 small business computer. This puts BMG in the unusual position of being distributors both for MicroCobol and its rival system CIS Cobol from MicroFocus. The company also sells CP/M, Digital Research's operating system, and the multiple version MP/M for BMG kit.

BMG has taken MicroCobol on board mostly because of the wide range of applications written by CAP that become available through MicroCobol and its operating system BOS. As well as the AutoClerk and Auto Index data management packages, there is a range including ledgers and inventory control.

Simplifying IC design

CUSTOM integrated circuit design can now be made simpler with the development of a cell library called Microcell by Plessey Semiconductors. Microcell enables designers to call up and position cells from the computer library and is particularly useful in transferring medium and small scale integrated functions from large printed circuit boards.

The system uses distributed gates which merge into the interconnection area. Circuits of 1,500 gates can be integrated now, but the potential is for the integration of 3,000 gates.

Honeywell offers Multics on DPS 8

HONEYWELL has formally launched the new release of its ultra secure interactive operating system, Multics, already ordered by University College, Cardiff (CW, October 28).

The company has also announced the availability of Multics on its latest large-scale mainframe hardware, DPS 8.

Called DPS 8/70-M, the machine hosting Multics can be expanded up to a main memory capacity of 64 megabytes.

At the same time, to encourage continued sales of the older Multics host, Level 68 DPS-M, Honeywell has announced that it can now be used in a less expensive single-processor version providing the same power as the existing multiprocessor.

The new release of the Multics software, MR 8, provides new features like support for Honeywell's big MSU 501 disc subsystem, substantially improved Fortran processing, simulation of the time sharing facilities provided by the GCOS III and GCOS 8 operating systems and enhanced electronic mail handling. A typical charge for MR 8 is £3,400 a month.

Honeywell points out that the configurability and expandability of the DPS 8/70-M follows that of its biggest large-scale computer, the DPS 8/70. The one big difference is that the 8/70 main memory is limited to 16 megabytes. The basic 8/70-M system consists of one CPU, one system control unit and one 35-slot input/output multiplexer. The system can be expanded to a maximum configuration of six CPUs, four SCUs and up to four IOMs.

The basic and maximum configurations of the 68/DPS-M are the same as the 8/70-M, but the older technology 68/DPS-M costs £930,000 in its basic form compared with £858,570 for the smallest 8/70-M. However, the 68/DPS-M is available for immediate delivery while the 8/70-M will not be available until late 1981.

Linked

Cardiff is installing a dual processor DPS 8 based system in November next year, employing what is described as a "sub-model" of the DPS 8/70-M. Cardiff says that if a "sub-model" with an adequate performance cannot be supplied by Honeywell in time, the company is to provide Cardiff with full-blown 8/70-M processors at the same price.

As expected, the system at Cardiff will be linked into the X25 based South West Universities Computer Network and will complement the Multics system already installed at the Avon Universities Computer Centre, the joint centre for the universities of Bristol and Bath.

Cat o'nine tails.

Bytech, the cats' whiskers for Centronics distribution in the U.K., also supply custom interfaces to fit all the featured CPUs – and many more besides.

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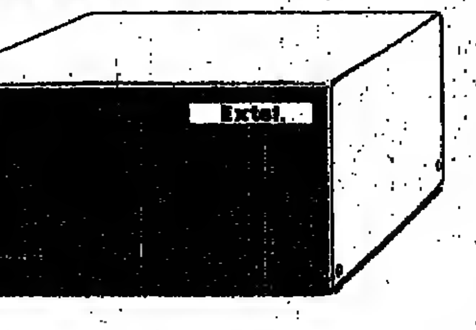

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The Exchange Telegraph Company Limited,
73/75 Scrutton Street, London EC2A 4TA.
Telephone: 01-739 2041. Telex: 27595.

PEOPLE and EVENTS

Wilkes-PCA names its main board members

JOHN MATTHEWS has been appointed main board director of the recently formed company Wilkes-PCA Data Supplies. He joined the Wilkes Group in 1978 as general manager of Wilkes Business Forms, and his previous managerial experience includes a period as business consultant to the Iranian National Airline.

Gordon Currell has responsibility for the profitable expansion of the new company, in his capacity as director and general manager. He has been with the Wilkes Group for 31 years, serving most recently as director and manufacturing manager. He formed the Online Division 18 months ago.

Divisional manager of the PCA interest of the company is Keith Brook. His experience of data processing has been gained as marketing services manager of Philips Business Equipment Division and general manager of Pyral UK.

Immediately prior to the new appointment, he was marketing manager of PCA Data Processing Accessories, a post he held for two years.

Software house restructures

LEASCO Software has reorganised its structure as part of a new growth policy.

The marketing activity will be headed by David Lamb, who will be responsible for all marketing, public relations and sales.

The company's five operating groups – Consultancy, Commercial and Business Systems, Advanced Applications, and G3 and Micro Applications – will report via their group managers to managing director David Markby.

Commercial director John Coomber and technical director Noel Jones will continue in their present posts.

Frank Jackson has been appointed to run the new Birmingham office of Allan D'Morias and Associates. He was formerly information systems manager of the Computer Special Systems Group at DEC.

Janet Marsh has been promoted to systems project manager at the OCR branch of Redifon Computers. She joined the company in 1979 as systems analyst for the Northern branch.

Terry Rankin is the new service manager at Adds (UK) in Manchester. He was previously service manager at Vcotek.

The Sovereign Golf Classic was won this year by a team from the Ministry of Defence. The tournament, open to Computer Machinery Company's customers, was held this year at the Belfry, Sutton Coldfield. Pictured (left to right) are: Mike Green (MoD, Royal Naval Supply and Transport Service), Irvin Ellis (managing director, CMC), Gordon Mott (MoD, RNSTS) and Jim Reith (MoD London). Runners-up were Noel Jarvis of Courtaulds, Alan Jackson of West Oarbyshire OC and Richard Gamble, financial director of CMC.

David Gay has been appointed to head the new Micro Computer Division of CBS Coanultants. He has been with the company for three years. Another new appointment at CBS Consultants is that of Ray Soull, who becomes software manager, small business machines.

James Jamfrey has left Data Recording Equipment to join Dataproducts Corp as vice-president of European marketing.

Ken Bradshaw has taken over as marketing director of the Plessey Solid State Division. He joined Plessey Semiconductors in 1973, where he'll continue as marketing director.

John Kemp and Michael Van Gent have joined Access Data Communications. Kemp is sales executive, Van Gent joins as systems manager to develop the company's range of micro and mini systems.

Hugh Thamsan has been appointed marketing manager with Wafer Microelectronics Institute. Since February this year, he has been a management consultant at Unilever International Management Consultant.

Malcolm Irwin has been promoted to the position of branch manager, Aldgate, at Prime Computer. He joined the company at the beginning of 1979.

Director of publications

NEW post of director of publications at Urwick Nexus has been filled by Maryenna Crook. The appointment marks the responsibility for the publications' infrastructure that supports the company's education programmes, research, training and consultancy activities.

Urwick Nexus will publish regular newsheets, reports and monographs under Chandos direction. She was educated at Oxford and Stanford, US, and began her career with Penguin Books. In 1970 she became production and copy editor of the Geographical Journal.

Anyone for squash?

A TROPHY and prizes worth £500 are on offer at the 1981 Wright Line Squash Tournament, announced at Compec on November 4. Sponsored by the Carter-Parrat Group, the tournament is exclusively for computer users and entry is free. It is open to teams of three, one of whom must be in managerial status.

Matches will take place initially on a regional basis. First round matches will begin on February 1, 1981, with the finals in January 1982.

As there is a limit of 256 team entries should be returned as soon as possible. The closing date is December 31. More than one team may be entered by any one organisation.

Applications should be made to the organisers, 1981 Wright Line Squash Tournament, SP&AI Ltd, Pember Suite, Turriff Building, Great Road, Brentford, Middlesex. Tel: 01-560 2257.

Liveware File

DIARY

NOVEMBER 10-11
Workshop. Computer Based Training. NCC, NCC, Oxford Road, Manchester. Tel: 061-228 6333.

NOVEMBER 11
Meeting. Computer games. BCS Croydoo branch. Maple Room, Fairfield Halls, Croydon. 7.15.
Meeting. Access. BCS Glasgow branch. Staff Club, University of Strathclyde. 7.00.
Meeting. Information retrieval. BCS Harlow branch. Saxon Inn, Harlow. 7.30.
Seminar. Computer Systems in Nursing. BCS Medical Specialists Group. Regional Conference Centre, Prestwick Hospital Manchester. Tel. 0277 224470 ext 27.
Meeting. Observations on the success of Japanese electronics companies. Speaker: Alan Benjamin, ICL. BCS Reading branch. Main Theatre, ICL Building, Lovelace Road, Southern Industrial Estate, Bracknell. 7.45.
Meeting. Digital multiplex techniques. IEETE. Lecture Theatre N129, Lanchester Polytechnic, Coventry. 7.30.

NOVEMBER 12
Meeting. Control and Operation of Utility Networks. IEE Computing and Control Division. IEE, Savoy Place, London WC2R 0BL.

NOVEMBER 13
Seminar. Practical approach to project leadership. IDPM. The Informatics Society, Peter Runge House, 3 Cathcart Terrace, London SW1. 2pm.
Meeting. Microprocessors – Applications and Implications. IEETE Department of Engineering, University of Aberdeen, Marischal College, Aberdeen. 7.30.

NOVEMBER 18
Inaugural meeting. Speaker: E. G. Cliff. IDPM Sussex and Surrey branch. Brighton Polytechnic, Lewes Road, Brighton. 6.00pm.
Meeting. A line manager's view of data processing. IDPM W. London branch. Bull Hotel, Cornish Oxford Cross, Buckinghamshire. 7.30pm.

NOVEMBER 19
Meeting. The mighty and powerful micro. IDPM Central London branch. Pearl and Dean Cinema, 15 Broadwick Street, London W1. 6.30pm.

NOVEMBER 26
Meeting. Management game. IDPM Sheffield branch. Comshare Office, Sheffield. 6.30pm.

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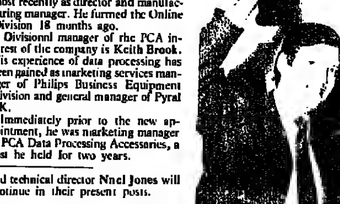

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80% of DP frauds result of 'pure opportunism'

OVER 80% of computer frauds come about because of pure opportunism rather than as a result of any great technical expertise on the perpetrator's behalf, says computer security consultant Brian Hitchen.

The culprit may be the unsuspected accounts clerk who has found a way of cheating the computer, Hitchen told delegates at a conference on computer fraud aimed primarily at accountants and managers, at Brighton.

"There are two main types of fraud," said Hitchen, of Sheerbridge Consultants based in Tunbridge Wells, Kent, "the triggered fraud, where the system more or less shows the user how to cheat it, and the academic fraud carried out by the programmer or systems analyst".

In the former case, the accounts clerk may discover a loophole in the security by means of an error – he may, for instance, mistakenly enter an invoice twice, to discover that the system hasn't picked up the error.

Succumb

A former operator, Hitchen said: "He may sit down and think 'I can work out something for myself here' and go on to cheat the system.

"Computer crime, you see, isn't the stripped jersey and mask type. It's rather like leaving £5 notes around on the floor and not expecting people to touch them – the temptation is often too much."

The "academic" fraud occurs when what Hitchen describes as "a very small proportion" of systems analysts and programmers succumb to temptation after designing, testing and implementing the system.

"It is the system analyst's function to design the accounting system and then try and find ways of breaking it. Fortunately, only a very small proportion of them use their knowledge to carry out computer crime."

Attention

Particular attention should be paid to the suppliers file the list of people the company is paying money to – as that may well have invalid entries on it.

"It is essential that it exists on magnetic tape and that you have a security copy for yourself. Run a utility program every month or so to see that the two lists match. If they don't, then look into the matter straight away."

Fraud often involves the entering of data after the main validation run and every month or so it is advisable for the manager or accountant to insist upon an immediate rerun for security purposes.

"Any discrepancy will show up immediately and should be investigated immediately," he said.

According to Hitchen, cheques should be written to an output file on disc or tape and not output directly to a printer.

"Be very, very careful where cheques are concerned. It's best to print the ones for large sums together and physically check them to see that there are no discrepancies."

He added that there was often contention between system analysts, who obviously want to get the best out of the system, and the accountants who were understandably concerned with security rather than system efficiency.

● An international conference on computer crime is to be held at the Intercontinental Hotel in Paris on November 20 and 21 by The Institute of Interbank Research. Speakers from all over Europe will present papers in French and English.

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The speakers will be Allen J Rose, co-author of the definitive "APL–An Interactive Approach" and David Terwey, who has been responsible for installing over twenty APL*PLUS in-house systems.

This one-day seminar will be held at the London offices of APL*PLUS on Wednesday November 26th, starting at 9.30 a.m. A buffet luncheon will be served and there is no charge for attendance. As space is limited, return the coupon below as soon as possible, or call Veronica Miller on 01-242 8135, to ensure your place.

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Billing DPs jobs – with a computer

IF you want to find a job in computing, use a computer. Impressed with this reasoning, an agency in Knutsford, Cheshire – which specialises in placing freelance operators, programmers and other computer staff – has implemented a system to match their skills with the contracts on offer.

The Professional Services Availability and Location Monitor, called Psalm for short, was written single handed by Vic Groves, MD of VNG Professional Services.

"Freelancers don't have time to sell themselves," explained marketing director Brian Rodaick, "so we do the selling for them. The system is giving us an edge in the market, and although we have thought of putting it on sale, we don't want to share the advantage with our competitors."

Unix for Z2H

A VERSION of the Digital Research operating system Unix for the Cromemco system Z2H, called Cromix, is available for £250 from London-based consultant Jarrogate.

Aiming at every micro user in UK

A MARKETING agreement between Wilkes Online Stores and PCA Data Supplies has created a new firm aimed at the micro market. Called Wilkes-PCA Data Supplies, the joint venture is a "logical step," according to its international marketing manager Allan Cater.

"Our prime objective is to reach every micro user in the UK," said Cater. The micro market level stood at 93,000 in 1979 and is expected to have doubled this year.

The new firm will provide a range of listing paper, bespoke forms and computer room consumable and durable items for DP and WP installations. Aware that it is selling to a service- rather than price-conscious market, Wilkes-PCA is taking fast delivery as its marketing strategy to set it claims, a new industry standard in the business forms field.

Most consumable items will be offered on an "ex-stock same day despatch" basis, from Online Stores situated in Alperton, Wolverhampton, Newcastle-upon-Tyne and Warrington.

It takes the fast-delivery theme a stage further with its Wilkes Quiklorm service, exploiting the market gap for small volume supplies of bespoke forms. Quiklorm provides single and multipart forms for microcomputer, minicomputer and mainframe user in quantities from 1,000 to 30,000 within a minimum delivery time of five days.

Forecast updated

AN update of its 1978 Market Series of product forecasts for the European market has been published by Pactel, based on its $8 million database Interbase-2. The reports are in eight volumes, covering areas including mainframes, business communications and word processing and they cost $850 per volume, or $1,400 including the earlier 1978 material.

Mark III addition

THE General Electric Information Services Company in the US has bought International Command, a financial planning and control system, and engaged the Computer Management Group to provide installation and support services to English and Dutch users of the package under Geisco's Mark III time sharing service.

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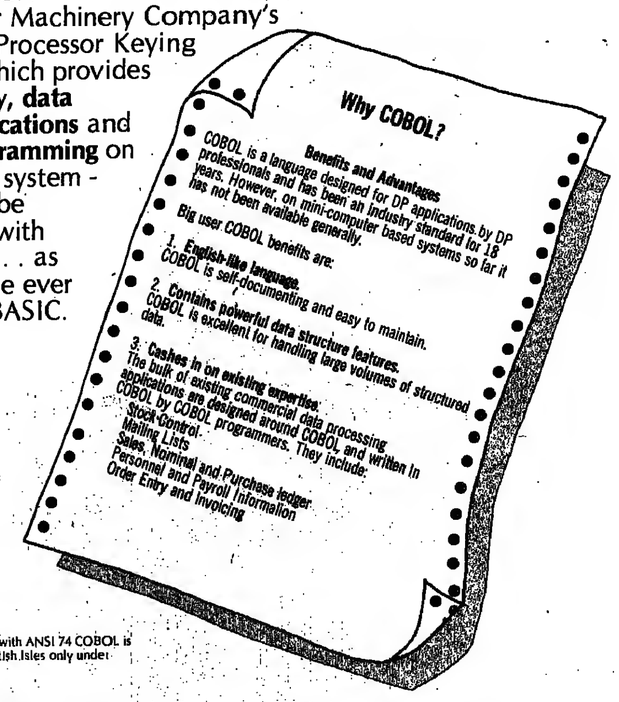

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Thousands visit our computer show

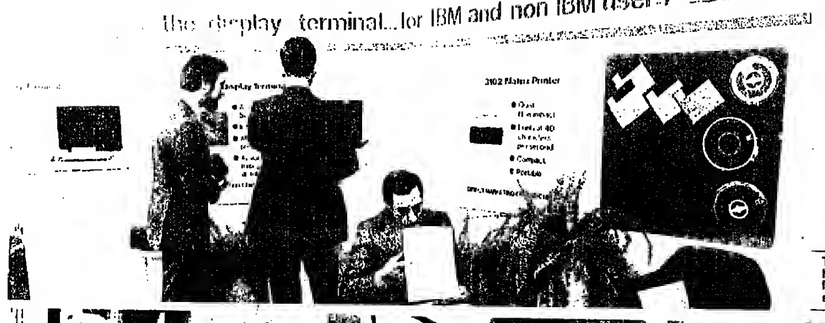
TONIGHT (Thursday), the UK's biggest and busiest computer show will be over for another year. Over 350 stands will have been dismantled.

From the 10.00 am start on Tuesday to the 18.30 pm finish this evening, tens of thousands of people have flowed through the turnstiles. Once they'd fanned out across the exhibition floor, old, half-remembered faces were spotted across a sea of heads and friendships renewed.

Behind the camaraderie was the hurly burly of any other marketplace. You could almost smell the money in the air and you could certainly hear the crackle of such transactions. Who knows what deals were struck?

There was something for everyone visiting. Among the highlights of the show were IBM's welcome Compec debut, the 12 companies on the Canadian stand, and Computer Weekly's free job finder service.

Now that jobs, even computer jobs, are becoming harder to come by, it came as no surprise to find that the job finder was well used.



Tucked away in a corner of the hall, IBM was exhibiting for the first time at Compec. On show was a terminal and a 3202 matrix

LEFT – this walking, talking and even dancing robot drew the visitors round the Perkin Elmer stand.

ABOVE – visitors to British Telecoms' stand were able to see a number of the latest fax machines designed for use on the Public Switched Telephone Network. In addition, video terminals were in operation to demonstrate data communications over the Eurodata network.

Canada's recent assault on the European computer market was marked by a large government-supported national stand, with 11 exhibitors. A similar stand is set up at Systems 79 and there are plans for representation at Sicob next year. The robots patrolled by the exhibitors on the stand.

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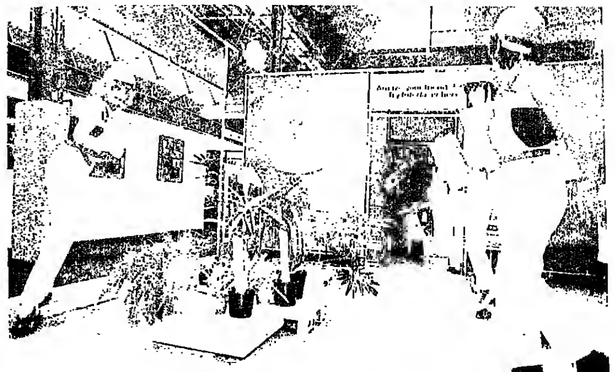
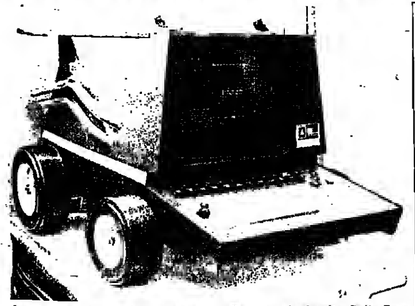


Anyone for roller disco! If there was a connection between Modular Technology's mains-powered fibre-optic modem and pretty girls wearing hard hats and roller skates, it wasn't easy to spot!

ABOVE – Sharp used Compec to launch its PC3200 business machine, scheduled for release in February 1981. The machine will be supported by Sharp's own software and packages including invoicing and stock and production control.

Photographs 4, 5 and 6

RIGHT – all quiet on the Compec front just before the crowds arrived on Tuesday.



Just to prove it can do specials as well as standard units, Daite Data Systems knocked up this little number. The sports model features twin carburettors.

An operator tries out Computer Automation's new data terminal. The SyFa 100 data capture and data preparation system, introduced to the Prose last month, was seen by the public for the first time at Compec.

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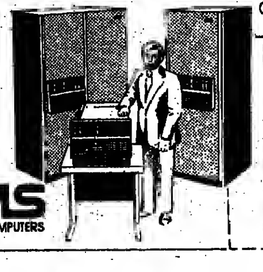

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Computing in a company as big as a country

BRITISH PETROLEUM is by far the largest company in Britain and the second biggest in Europe. With gross revenues of £23,033 million last year, it is the sixth largest company in the world. Its sales equal twice the amount of IBM's and 30 times those of ICL.

BP's revenues are not just derived from what is usually thought to be its traditional oil and natural gas operations. BP owns, or has an interest in, hundreds of subsidiary or associated companies located throughout the world. Its chemical derivatives appear in thousands of products from detergents to motor vehicles.

Gold

It is one of the largest suppliers of animal feed in Europe, owns one of the world's biggest shipping fleets, and has, for example, 5,000 auto accessory shops. In recent years, it has increasingly diversified into areas such as coal, minerals, and metals such as uranium and gold, and BP is now the eighth largest private coal company in the world.

To offer computer techniques and services to users throughout the company, BP organises its data and information processing operations in line with the way the BP group itself is organised.

BP Trading is responsible for the business activities of the BP Group. It acts as the corporate head office and is divided into international business trading streams relating to activities such as fuel sales, tankers, oil production, chemicals etc.

Within BP Trading there are a number of service departments, created to provide support facilities for all such business streams. One of these is the computer services department.

The next layer of the company's structure consists of the principal operating companies throughout the world. These operating companies are either organised on a national basis or they are product related organisations, such as BP Chemicals and its subsidiaries or associated companies. Groups of operating companies also exist in many countries with major operations in the US (which includes BP-majority-owned Sohio), France, Germany, Australia, and Canada. Such companies each control a number of subsidiary or associated companies. Thus, each country's operating organisation may be responsible for numerous BP activities ranging from oil and chemicals to coal, minerals and so on.

The overseeing head office companies of each of these operations are also supported by service departments (including computer services operations. Separate from these computer and service operations are many specialist departments, many of which also employ their own computer people specialising in particular areas, such as process control, research and in-plant computing.

Annually every BP company makes a return listing the principal computer hardware (ie mainframes and peripherals), main operating software, languages used and the number of data processing professionals employed within each computer department. The resulting Black Book, containing single line entries and no detailed descriptions, currently runs to some 100 pages of small print and this does not even cover micros, word processors or minis used in special applications.

It is at this point that one can begin to grasp the scale of data processing within BP, and Computer Weekly's confidential analysis of the Black Book produced some interesting figures.

In Computer Weekly's estimation, the principal computer operating centres of BP worldwide had a combined budgeted turnover in excess of £90 million this year alone. The value of central hardware installed (though difficult to assess precisely) is of the same order. Computer staff employed in the main centres number some 4,000, almost half of these in the UK. Many, including the staff of the BP-owned Scicon Group, are consultants in their own right.

The BP Group in Britain also recruits a significant number (150 this year) of graduates into computer activities. Finally, the Black Book reveals a massive volume and wide range of mainframes and minis.

Dominance

There are some 30 mainframes in the UK alone, BP's mainframe concentration being based on Univac 1100 hardware. There are eight very large Univac configurations in Britain, including two 1100/82s each with 2096K-word capacity. These, with an 1100/21, are run by BP Trading's Computer Services Department. They utilise some 14,000 megabytes of disc store and run literally hundreds of online terminals linked into various user departments.

BP Oil, the associate company responsible for refining, marketing and distribution of petroleum products in Britain, also runs an 1100/81 and 1100/21. With three similar Univac 1100 configurations at Scicon Computer Services, Univac has obviously achieved computing dominance with BP in the UK.

ICL emerges as the second major mainframe supplier to BP in Britain, with nine 2900 installations.

On an international basis, it is IBM that dominates with three 370 installations in Britain and 20 more 370s throughout the rest of the world. Additionally, IBM has found niches for System 34s, System 3s, System 7s, 3033s and 3031s as well as 1800s used in process control. Finally, there are several IBM 4300 Series machines both installed and on order.

This is not to say, however, that other manufacturers are shunned, for one can still find Burroughs installations, ranging from B-80 up to a B-3700, and a number of CII-Honeywell Bull installations (61 and 64 Series). There are also CDC Cyber 175s in the US and an Amdahl 470V/5 in France.

In the mini area we counted many large DEC PDP-11s and VAX 11-780s. A variety of other manufacturers also get a look in, ranging from Texas Instruments (TI 980s and 990s), to Hewlett-Packard (HP 1000s and 3000s), Ferranti (Argus 500s), Redifon (Seecheck), Data General (Eclipse), Datapoint (1500s, 2200s, 5500s and 6600s), Nixdorf (620), and many others besides.

Autonomy

In some respects this may seem an unusually mixed bag of hardware, particularly as there is no international standardisation of mainframes in the main computer centres. However, one must take into account factors such as the BP principle of giving its operating companies a high degree of autonomy. Additionally, with a number of the installations, the relationships with manufacturers are historical, being based on different requirements at the time of installation.

Finally, within the context of autonomy, one must also consider the size of the individual BP organisations in their own right – BP Oil's 1979 revenues in the UK alone were almost four times the total turnover of ICL.

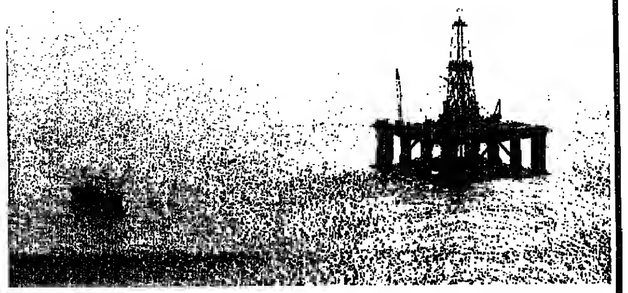
Old tabulating machines apart, and a pre-1962 Deuce system used mostly for scientific work, ICL (ICT) supplied the first commercial systems to BP Trading during the early 1960s, firstly a 1301 and later a 1905. The latter part of the 60s saw the first selection of Univac kit. This was based on the need to further develop linear programming techniques, an area in

● Turn to page 17

Large multinational organisations are rarely willing to talk about their operations, even less so about their use of computer techniques. But for the first time, Computer Weekly has been able to examine at close range Britain's largest company – British Petroleum.

BP is big – its annual turnover is larger than the gross national product of Greece, Finland or Bulgaria.

In this, the first of four articles examining BP's data processing operations, we look at the structure of a multinational company.



Above: BP's drilling rig Sea Conquest, east of the Shetlands.

●

Left: Flare stack and drilling rig on board production platform FB (Graythorp II) in BP's Fortiss oilfield in the North Sea.

Users have a major say

From page 16

which BP was a pioneer. At the time, this area was seen to be Univac's great strength, with Univac kit capable of crunching large amounts of data quickly.

But while Univac was first solely used in the scientific/linear programming area during the 70s, the dividing lines of linear programming and conventional business requirements merged, and Univac came out on top with the greater part of BP Trading's commercial work being transferred to it for the sake of uniformity.

It was the early requirement for linear programming which also first led BP to use, then buy, the Scicon Group, with its bureau and software expertise in mathematical programming.

Profit centres

The main computer departments and centres – BP Trading, BP Chemicals, BP Oil, Sohio and the head offices in Germany, Netherlands, etc – all act as computer services companies to the respective user departments of the companies that come under their BP umbrella. They are mostly structured as profit centres, providing user departments with services – processing services, consultancy, systems programming and development, data communications and engineering, or technical support.

Although a high degree of autonomy is maintained in the various companies worldwide, both in business and in computing, certain standards, liaison, interchange of technical information, and the presentation of a united front to the manufacturers, are formally organised.

A number of different regular meetings are held, at which all major sectors within the BP Group are in one way or another represented. A UK Computing Review Committee established within BP Trading involves representatives from BP Oil, BP Chemicals and Scicon.

Conference

There is also an international computer co-ordination committee, again run by the central organisation with BP Oil, BP Chemicals and overseas representatives from Germany, France, Sweden (for Scandinavia), Benelux and Switzerland (who represent the interests of the smaller companies in Europe).

Every two years BP runs its own international computer conference, which next year is expected to involve over 100 participants – the top computing people and users within BP worldwide. Next year's conference theme is Information Processing for BP in the late 1980s.

Users within BP have a major say in computing requirements, an essential feature being a computer planning advisory group which involves senior management representatives of the largest user departments within BP's headquarters.

BP's computer services department's general manager, David Eggleton, considers that information processing needs must be driven by corporate requirements and service departments must tailor their development plans to the needs of users within the organisation.

If users play a significant part in the definition of forward computing needs, BP's computer department management believe they are in a much stronger position to influence hardware and software.

As micros, minis, word processors, electronic mail systems and other types of information handling systems are being increasingly installed direct into user departments, a new emphasis is placed on the role of the central information processing department within large organisations.

In particular, within organisations such as BP, more and more information is being stored and transmitted electronically, and with this information being increasingly regarded as a corporate asset, it is necessary to develop and implement policies for guarding and co-ordinating its use within a company.

BP is well aware of this and feels that its computer departments have a part to play in the development and operation of communications networks and software packages which will ensure the security of information.

User-driven

Although there will still be a need for certain application developments to be carried out in central data processing departments, BP thinks that the future will show an increasing emphasis on the support of user generated developments.

David Eggleton says that most computer manufacturers are recognising these increasingly user-driven attitudes and that, certainly in BP's case, they are becoming more prepared to talk about their planned technical developments. Such advance knowledge is important for organisations the size of BP as it enables them to develop long-term strategic requirements for central and distributed systems.

An advantage of being a major international purchaser of computer hardware is that most manufacturers are prepared to listen to the company's requirements, but BP has made it clear that only those manufacturers prepared to talk about their future developments are likely to be considered in BP's own forward plans.

● Part Two of this series will deal with the DP role in channelling natural resources into usable products.

BP's first computer, the Deuce, developed by the National Physical Laboratory in collaboration with English Electric, and used by BP for scientific work.

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DATA ANALYSIS

Working with the full entity model

by Rosemary Rock-Evans

Section I – Part 6

ALL the previous articles in the series have been used to describe the basic constructs of entity analysis and their diagrammatic representation in the entity model.

We are now in a position to be able to draw the full entity model of the hospital system described in Part 2, and this model will be used to describe how further refinements can be made and more information deduced.

The entity model

Figure 1 shows the entity model for the hospital system which has been produced from the results of entity analysis so far.

Various assumptions have been made in drawing the model about which relationship types the user may have been interested in. If we had had users to ask, obviously these assumptions would not have had to be made. There are several examples in the model of two relationship types between the same two entity types. It may not at first sight be obvious why, but reference to the rules about relationship types should make the reason clear.

Basically, the relationship types were said to be different if the members of the potential relationship types were different for any one owner. Thus if theatre sessions are cancelled, the entities which are members of the "Operating Theatres are to hold Theatre Session" set, are different from the entities which are members of the "Operating Theatres held Theatre Sessions" set and so on. In addition, consideration of the entities' life histories can cause optionality which is not at first obvious. For example, if operations are cancelled, they will never be undergone by the patient.

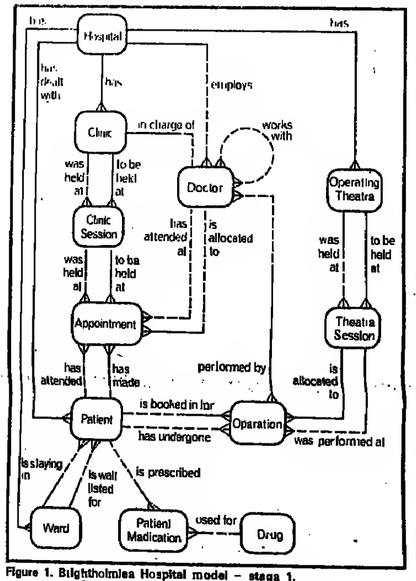

Figure 1. Brighthelmlea Hospital model – stage 1.

Inclusive and Exclusive relationship types

At the moment, the model in Figure 1 describes the environment adequately, but cannot express some of the constraints which may be in operation, for instance, the consistency constraints.

Two new concepts are introduced to help express these complexities – the inclusive and exclusive relationship.

1. **Inclusive.** Where an entity (occurrence) can participate in a relationship of one type, if and only if it also participates in a relationship of a different type, it is called an inclusive relationship. The second relationship is said to include the first, and the entities participating in the second are a subset of those participating in the first. Several examples of this are seen in the model.

A Patient cannot have attended for an Appointment unless he had previously made the Appointment. A Patient cannot have undergone an Operation unless he had previously been booked in for the Operation (clearly this hospital does not deal with emergency cases).

The way inclusive relationships can be depicted in the model is shown in Figure 2. The relationship type which must be present is shown, as before, as a line linking the two entity types. The relationship type whose occurrences cannot exist unless corresponding occurrences of the first relationship type exist, is depicted as a line at angles to the first relationship type.

2. **Exclusive.** Where an entity may participate in any one, but not more than one of a number of relationship types at one point in time, it is said to be exclusive.

In Figure 3 some examples of exclusive relationship types are shown, with the method of depicting them on the model.

Many to Many relationship types

It was found, while working on the hospital example, that initially there were two entity types – Operation and Doctor. Let us assume, however, that upon examining the records we then found that the user was concerned with information about the doctor's attendance at an operation such as the responsibility of the doctor at the operation and special conditions. The Doctor's Operation Attendance becomes an entity type.

In Figure 4, this situation is shown. Initially the relationship type would have been many to many, but the many to many relationship was replaced by two one to many relationship types and an entity type.

As a general rule, every many to many relationship type should be examined to ensure that an entity type is not missing. The entity type may not have been given a name by the user, but if useful information is collected about it, it should still be included.

In Figure 5, the one remaining many to many relationship type has been examined to see whether it does not hide an extra entity type. The "Doctor (works with) Doctor" entity type does not seem to be meaningful as no rules can be established for determining how the members of each "Doctor - Doctor" relationship are created. If the occurrences of the doctors are examined, however, it is immediately obvious that one doctor works with another doctor by virtue of their membership of a team. There is thus a new entity type, "Team," and an entity type which describes a "Team Member" (e.g. such information as the Date allocated to the Team, etc).

The discovery of the Team entity type has resulted in the discovery of extra relationship types – that of a Team being allocated to a Theatre Session – and a new entity type, "Nurse," discovered as a result of the user telling us that nurses can also be members of a team.

One further point needs to be made about many to many relationship types. Where a combination of many to many relationship types occurs between entity types, it is possible that an extra entity type exists to which *all* are related. An example is given in Figure 6. If we had discovered Nurses, Doctors and Teams for the model on the left-hand side, might have been the result. There are thus three many to many relationship types between the entity types. Using the guidelines above, the Team Member entity type would have resulted as shown on the right.

The first stages of entity analysis are now complete and the result is the entity model, which can be used as a communication tool as a summary of what the enterprise is interested in, and what it needs to operate. In the next article we will turn our attention to the other phase of data analysis – functional analysis will be tackled to gain insight into the other aspects of a business' operations: what it does.

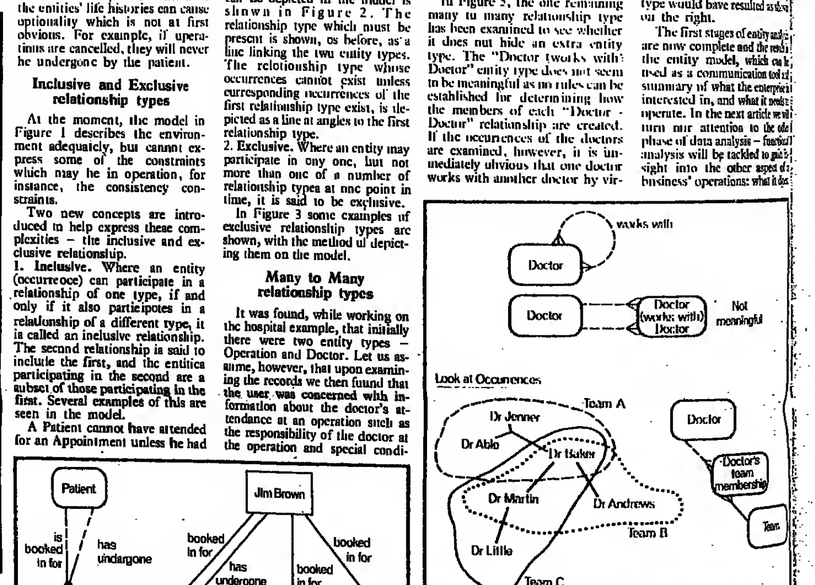

Figure 2. Inclusive relationships.

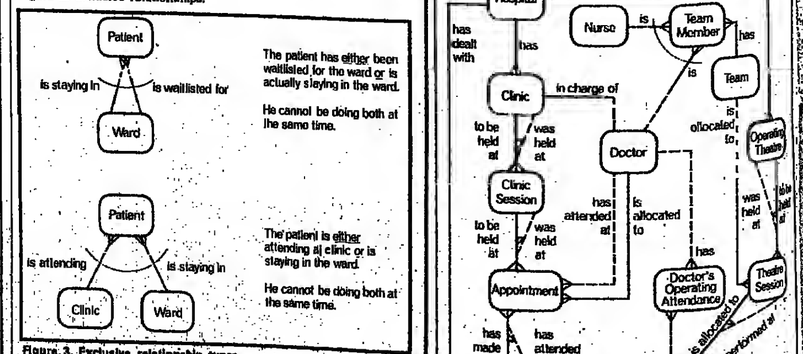

Figure 3. Exclusive relationship types.

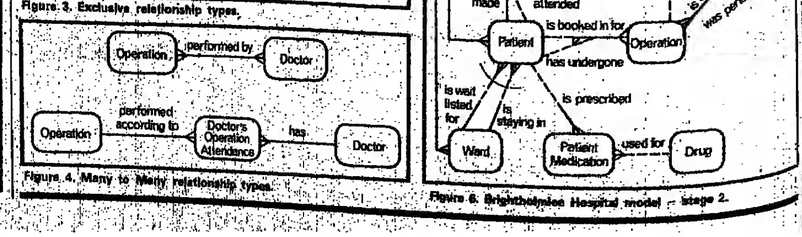

Figure 4. Many to Many relationship types.

Figure 5. Two examples of Many to Many relationship types.

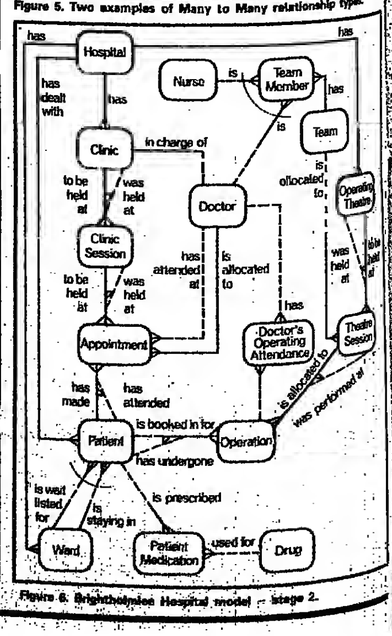

Figure 6. Brighthelmlea Hospital model – stage 2.

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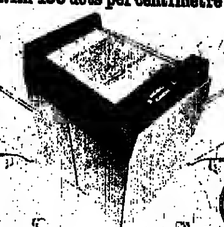

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Fujitsu tests the water prior to European attack

IN a bid to break into the European market for all its products, apart from big mainframes, Fujitsu is to mount a Europe-wide sales survey. West Germany and Spain are exempted as Fujitsu already has marketing agreement there.

It intends to go ahead with a European launch for the Word Machine office products of Fujitsu America Inc which are offered as alternatives to the IBM display writer and can emulate the word processing features provided by the IBM 8100.

But there is still a great deal of uncertainty about DP systems, in particular the M130F, 140F, 150F and 160F medium scale mainframes announced by the company last year as Fujitsu's answer to the IBM 4300 family.

Appointing distributors in Europe for these machines would tread on Siemens' toes because the Fujitsu machines would find themselves in competition with the medium scale machines built and sold by Siemens itself as well as with the IBM 4300s.

Problem

There would also be the problem of supporting the OSIV F2 operating system, which differs significantly from IBM's DOS/VS and DOS/VSE. At the moment OSIV F2 is only used in Japan and in a few other countries where Fujitsu maintains direct sales offices like Australia, Brazil, South Korea and Spain.

According to Fujitsu, its US distributor agreement with engineering giant TRW, which was originally assumed to embrace the M140F and M160F machines is confined to the V830 general purpose minicomputer.

Fujitsu's bigger OSIV F4 operating system is used on a wider geographical basis than OSIV F2 that Siemens supplies it under the name BS3000 to European users of the Fujitsu M180 and M200, which are sold by Siemens as the 7.870 and 7.880. Fujitsu says that OSIV F4 is larger and more facility rich than IBM's MVS and enables IBM programs to be transferred easily to a Fujitsu machine. MVS, not surprisingly, is the operating system run by the processors supplied by Fujitsu as a back-up source to Amdahl, the IBM compatible mainframe supplier 27% owned by Fujitsu. Those machines are built at Fujitsu's mainframe plant at Namazu near Mount Fuji as are the machines shipped to Siemens and those for customers in Japan.

Air cooled

They all employ the same distinctive looking air cooled emitter coupled logic devices as those used in the machines built by Amdahl itself at Sunnyvale, California.

The current generation of ECL devices are limited to 100 gates at the moment compared with a maximum of 550 in the circuits used in the latest big Hitachi machines.

Fujitsu says that it is waiting for the announcement of the H Series by IBM before introducing new machines employing higher density ECL and offering more power. The biggest existing processor, the M200, is rated at 1.2 to 1.3 times the 3033 uniprocessor or up to six million instructions per second.

Exchange

Fujitsu intends to supply Amdahl with ECL and other semiconductor technologies for future machines and the two companies regularly exchange technical information.

But their relationship does not extend to having Fujitsu technicians permanently based at Sunnyvale or Amdahl experts in Japan.

Fujitsu claims to exert little pressure on Amdahl in strategic decision making and denies that it imposed conditions on the proposed merger between Amdahl and Storage Technology earlier this year.

Reports at the time said that Storage Technology called off its talks with Amdahl because Fujitsu objected to its ambitions to become a major force in the microelectronics manufacturing business.

In the area of peripheral equipment Fujitsu, like Hitachi, does not rely in Nippon Peripherals, the firm they own jointly, as its sole source of kit. Fujitsu has its own magnetic devices plant at Nagano, about 100 miles north east of Tokyo, where the product line now includes a disc drive called Eagle which is intended to offer users comparable storage facilities to the IBM 3370.

But Eagle was not designed as a 3370 compatible unit.

It uses a 10 inch diameter platters rather than the 14 inch platters on the 3370 and most other big disc drives, and comes with a capacity of 470 megabytes per spindle, compared with 570 megabytes on the 3370. Deliveries of Eagle will start in January next year.

Uncertain

Unlike Hitachi which has already announced an alternative to the IBM 3380 drive Fujitsu is uncertain at the moment about going ahead with a 3380 type unit. At the same time it has no intention of buying Hitachi's 3380 alternative, the H8598.

Fujitsu's manufacturing operations outside Japan will soon include the €40 million plant it is setting up in Eire to produce memory devices (CW, September 11) and the well established operation in Spain, Secoinsa, which is 25% owned by Fujitsu, has just added the V830 minicomputer to its product line.

Fujitsu already has a small base of mainframe systems in Spain including three big machines at CTNE, the Spanish PTT, and one M180 at the Spanish statistical office which will soon be joined by a second.

In China the Fujitsu user base includes eight of its older Facom 8 series medium scale mainframes running an earlier operating system to OSIV F2. In the longer term Fujitsu's Japanese language processing system, JEF, will undoubtedly prove a vital sales aid in China because the Kanji characters that it handles are based on Chinese characters.

FUJITSU and Hitachi are the two biggest Japanese owned computer manufacturers and the only mainframe builders in that country to have started developing customer bases for large machines in the US and Europe.

The two biggest machines built by Hitachi, the M180 and M200H, are now sold in Europe under different names by Olivetti Computers, BASF and National Advanced Systems. The latter also sells those machines in the US and helped Hitachi modify their instructions and I/O protocols to enable them to run IBM operating software.

Fujitsu's two biggest machines, the M180 and M200, are built at Namazu (left) and are sold in West Germany by Siemens as the 7.870 and 7.880. The West German firm is free to sell them in any EEC country.

●

Fujitsu and Hitachi both participated in the Japanese government sponsored four-year VLSI development programme which ended earlier this year. They are continuing VLSI work independently on technologies like MOS RAMs and emittar coupled logic circuits.

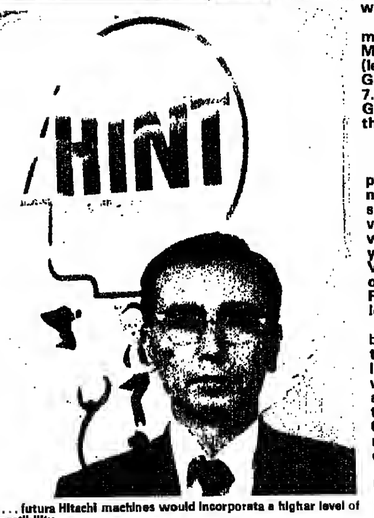
But the two firms are both still being helped by the government, this time in the area of systems software where Japanese firms are relatively weak, through the Electronic Computer Basic Technology Development Association.

The government is going halves with Hitachi, Fujitsu and the eight other companies that belong to the association on a £100 million investment in software for networking database management, virtual machine support, Japanese language processing and peripherals and terminals to support the latter. The whole aim is to make sure that IBM is kept in its unusually lowly place in the Japanese market where it has now been overtaken by Fujitsu and where its market share is about 23%.

●

KEITH JONES visited the head office of Fujitsu and the computer division of Hitachi in Tokyo and talked to marketing personnel about overseas sales strategies.

Despite the recent warnings by EEC Commissionar Viscount d'Avignon about the Japanese overtaking Europe in information technology the overall impression was that both firms are adopting a cautious approach to expansion both in the US and Europe.



SAITOH . . . futura Hitachi machines would incorporate a higher level of IBM compatibility.

Hitachi takes cautious line to changes in export marketing

FEW changes will be made in Hitachi's overseas marketing arrangements in the near future in the US and Europe. No more distributors for its large-scale IBM compatible machines will be added to the existing line-up of National Advanced Systems, Olivetti Computers and BASF. And Hitachi has set no date for marketing its computers directly here.

Moreover, there are no plans for selling the new Hitachi M140H, 150H and 160H computers in the US and Europe which compete with the IBM 4300 series.

This was the cautious message put across by Mitsuhiro Saitoh, manager of the planning department of Hitachi's computer group when asked to outline its expansion plans.

He also pointed out that Hitachi's work with NAS on making the big Hitachi machines totally IBM compatible was completed and that the meetings between NAS staff and Hitachi in Japan were now finished.

Moreover, such co-operation in the future would probably not be needed unless NAS required special features on upcoming models. Future Hitachi machines would incorporate a higher level of IBM compatibility.

Tight-lipped

Saitoh also remained tight-lipped about any new machines being lined up to counter the forthcoming IBM H-series and whether Hitachi was waiting for H before making any announcement. But when asked if the M200H with its eight million instructions per second power rating in uniprocessor form was big enough to compete with H, he conceded that Hitachi was "thinking about" bigger machines.

Modified

While big Hitachi machines in their modified versions run primarily under MVS and in US and Europe, the main operating system in Japan is VOS/3, the most powerful of Hitachi's VOS family of operating systems. They go down to VOS/0 which runs on the L330, a machine that roughly matches the IBM 370/115 in performance.

Higher up the performance scale VOS/1 is the standard system for the M140H, 150H and 160H. The M140H offers a power rating almost twice that of the 4331, the M250H almost matches the 4341, while the N160H is about 30% more powerful than the 4341.

But the degree of compatibility between VOS/1 and IBM's DOS, either DOS/VS or DOS/VSE, is not high and is one reason why Hitachi has no plans to sell the machines in the US or Europe. Another problem is that the Hitachi computers would probably find themselves being sold in competition with the medium scale IBM compatible machines manufactured in house by NAS.

According to Saitoh, this would be highly undesirable. Hitachi's relations with its marketing partners were considered of great importance.

Potential

Some of the three older medium range Hitachi computers, the M170, M160II and M150, have been sold in China, a market with enormous long term potential. KEIS, Kanji processing Extended Information System, the Hitachi software for handling Chinese Kanji characters will be a vital sales aid there as well as in Japan itself where Kanji is still widely used together with the phonetic Hiragana and Katakana alphabets.

Saitoh pointed out that KEIS differed from the Kanji processing systems developed by other Japanese manufacturers in being supported by all Hitachi computers from the M200H to the L320 small business system.

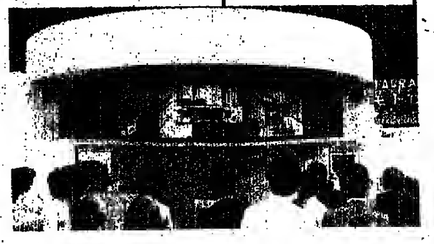
Considering that Hitachi is smaller than most mainframe manufacturers outside Japan, it is remarkably self sufficient in the area of peripheral manufacturing. It still buys tape drives and IBM compatible disc units from Nippon Peripherals, the firm that it owns jointly with Fujitsu, but Hitachi has gone its own way with the development and manufacture of new tape and disc drive models.

They include the MT100 tape drive family with 6250 bpi Group Code Recording and the MT200 streaming tape drive which can transfer data at 180K-bytes per second. The H8598 disc drive, Hitachi's answer to the IBM 3380, is scheduled like the IBM kit for delivery in the autumn of 1981. The 8598 will employ thin film head technology and offer a capacity of 1,260 megabytes per spindle.

Rank	Company	DP sales	% Share
1	Fujitsu	326,762	23.3
2	IBM Japan	324,245	23.2
3	Hitachi	216,000	15.5
4	NEC	200,000	14.4
5	Nippon Univac	73,607	5.3
6	Oki	62,800	4.5
7	Burroughs	54,600	3.8
8	Mitsubishi	53,000	3.5
9	Toshiba	50,400	3.8
10	NCR Japan	34,285	2.5

Figure 1. Top 10 computer manufacturers in Japan, 1979.

A major feature of Fujitsu's stand at the Data Show, which was timed to coincide with IFIP, was a demonstration of JEF, the Japanese language Extended Feature. JEF provides system interaction using the Japanese language which is a mixture of Kani characters and the Japanese phonetic alphabet.



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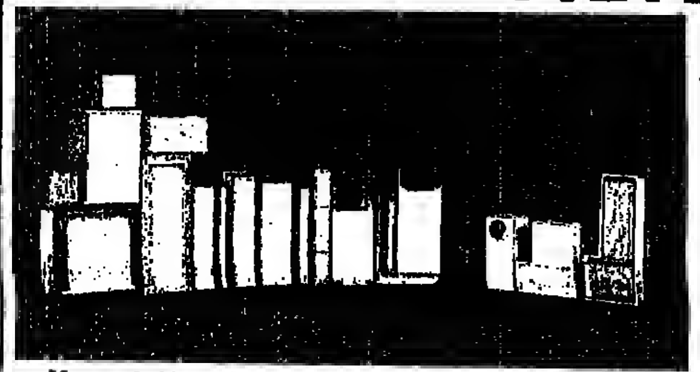

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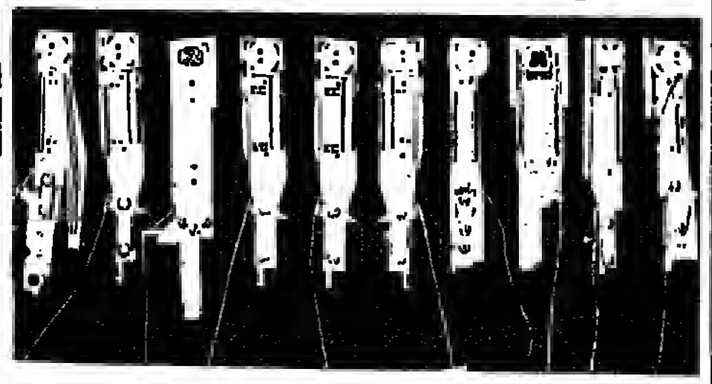

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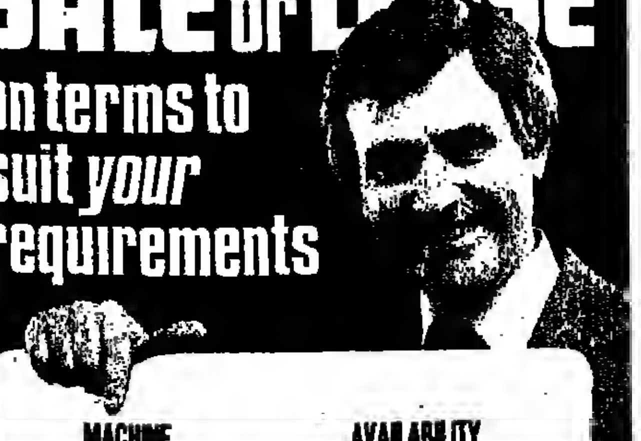

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BOOK REVIEWS

by Focus

Chipping away at probability

A book uo casino craps, by C. Ionescu Tulcea. 149 pp. £6.70. Van Nostrand Reinhold Co Ltd (CW), Molly Millars Lane, Wokingham, Berks.

WHEN the chips are down – whether silicon or plastic – the odds are on trouble. The chances that a player will throw a highly regarded seven or eleven are about equal in the betting on the site engineer: that he will turn up, be able to identify the faulty micro chip component and have suitable replacement units on hand.

As this book makes clear, those who have an appreciation of the law of probabilities, have a head start on the rest of us.

Presumably, it was this aspect of system dependability which attracted the attention of the Computer Weekly book review editor?

A considerable part of the book is devoted to what is called "gambler ruin formula". DPMs, of course, know the formula well. It normally operates during peak work loads when the ops manager ignores the advice of the site engineer and takes a chance that the kit will stay up and running.

Other notable DP risk areas include running a new program without having the respective analyst on hand; running an application without adequate back-up security or hoping that the depleted stock of continuous stationery will last out. Such DP enterprises would get short odds by the author.

No book on chips would be complete without a section on cheats. Casino craps is no exception and much data is presented on the topic.

Unfortunately, the book omits any reference to bluffing. This could well be tough luck on the DP professional who could do with some practical help!

Provides logical help

Computer and microprocessors made simple, by Ian Burdess and George Olsen. 239 pp. £2.50. W. H. Allen & Co Ltd (CW), 44 Hill Street, London, W1X 8LB.

THE DP industry is well aware that behind the laboratory doors of university and industry research organisations, high level computer technology is developed. At the same time, considerable attention is being given by countless students to the study of Boolean equations, differential coefficients and epitaxial growth paths.

For all those involved in such areas as well as those whose misfortune it is to have to grapple with basic primer questions, the latest "Made Simple" book could well provide logical assistence.

In fact for anyone contemplating building their own micro, this book would be a considerable benefit. But beware – by no means does the book attempt to live up to its title.

By page eight, we are already plunged into the not-so-simple world of hybrid computers and mathematics according to the level of pi.

"Computers and Microprocessors" then, is addressed to the research student, particularly those with the BCS, City & Guilds and BEC/TEC examinations in mind.

The book is of considerable interest and benefit. It is well structured and clearly illustrated and certainly must be one of the best value-for-money books around.

For students of DP and accounts

Computer peripherals, by Barry Wilkinson and David Horrocks. 310 pp. £6.75 (paper). Hodder & Stoughton (CW), PO Box 702, Dunton Green, Sevenoaks, TN13 2YD. Tel: 0732 50111.

Integrating the computer with your business – accounting for computer charges, by James Porter and Jonathan Chapple. Edited by Ron Yearsley. 308 pp. £9.50 (paper). HFL (Publishers) Ltd (CW), 9 Bow Street, London, WC2E 7AL. Tel: 01-836 9081.

IT appears to be fashionable in the current computer publication world to seek safety in numbers. Published recently are two books, both featuring academic co-authors.

"Computer Peripherals", as is the case with most technical books, loses little time in plunging the reader into the deep end. By Chapter Two, we are grappling with 20 milliamp current loops, digital to analogue converters, analogue to digital converters, multiplexers and multiple analogue channels, and complete analogue systems.

Bubbles

As can be expected, bubbles feature strongly. Apart from basic bubble memories, the book covers bubble creation, bubble detection, and bubble domains.

For those perhaps more anxious to discover if Storage Technology has the edge on Memorex in the field of charge coupled devices, or BASF a more competitive price structure than IBM, the book offers no helpful guidelines.

Where the book does score is in the presentation of peripheral technology, whether involving the basic line printer or the oft-promised voice response system.

For such an up-to-date and well produced book, the list of references is surprisingly sparse and dated.

Timescales are likewise confused in the other paperback "Integrating the computer with your business". Despite a publication date of September 1980, the authors, in a final chapter suggest that among the round-the-corner developments are database systems, minis and micros and the associated office revolution. Coming over the horizon is remote entry by users.

Pat or club

The book is aimed at the reader with more than a passing background in DP accounting. Not content with two authors, the publishers have added the services of an editor – this time the well respected Ron Yearsley.

As a result, the book soon heads off into the world of computer management and perhaps surprisingly, gives a pat on the back to the DP manager, whom it apparently regards as a friend.

Not all accountants however would join this particular appreciation club, many preferring to exchange the pat for a hefty club.

Both books can be recommended – particularly for the students of computing, accounting and peripherals.

The well produced "Computer Peripherals" cost £6.75. More in keeping with the accountancy world is the Porter and Chappel work at £9.50. As ever, the accountants have the Power, the Glory and the cash.

First in series for DP chiefs

Advances in data processing management, by Thomas Rullo. 202 pp. £14.50. Heyden & Sons Ltd (CW), Spectrum House, Hillview Gardens, London NW4 2JQ.

ANY book which advises the reader to organise the computer room so as to leave room for circulation and then plunges deep into the abstract world of algebraic decision trees, is hard to define.

Unfortunately, sorting out the practical wood from the abstract trees is one of the major handicaps of the book. The format closely follows contemporary publishing styles of having one editor and a dozen or so contributors.

As is only too common in such combined enterprises, the contents and structure reflect a random approach.

The book also follows the accepted practice of having selected the contributors from the academic DP world.

It certainly seems to be the case that practising DPMs seldom have the ability or time to write anything more dramatic than a check-list for a new project or safety operating guidelines.

If they did, the subsequent publication would surely concentrate less on statistical decision theory and assessment of probability measures, in favour of cost/performance evaluation or practical delivery dates.

First in series

The book is the first to be published in what is to be a series of "Advances in EDP management", covering database, programming, distributed processing, communications and security.

The DP management volume certainly aims to please, covering such computing basics as financial alternatives, user involvement, resource management and software packages.

Management by objectives is strongly featured but, if one main objective is the complete mastery of this book, then the manager will have little time available to implement his decisions.

The book is notably short on giving advice on how the DPM should react to crises. The section devoted to "vapour barriers for humidity control" may well appeal to the local IBM engineering team but the local DPM could well appreciate some practical hints on how to deal with determined salesmen, managing directors and shift leaders.

The publishers suggest that the book will be updated annually in which case the opportunity might well be taken to eliminate such basic English corruptions as "floorplanning," "people reduction," "conceptual steps" and "resource availability." Also the addition of an index next time round would be helpful.

There is, however, little doubt that the book could assist DP entrants, especially BCS exam students. In particular the comprehensive analyses would be of considerable help.

It does seem almost obligatory for computing text books to close with a feature on future computing. This book is no exception and Earl Joseph of Univac is on hand to present his forecast. According to Joseph, the future will hold no problems – only technological opportunities. DP managers of the future will no doubt be very relieved.

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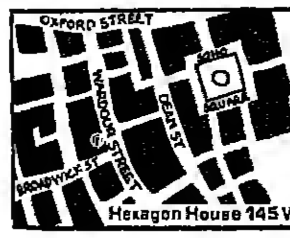

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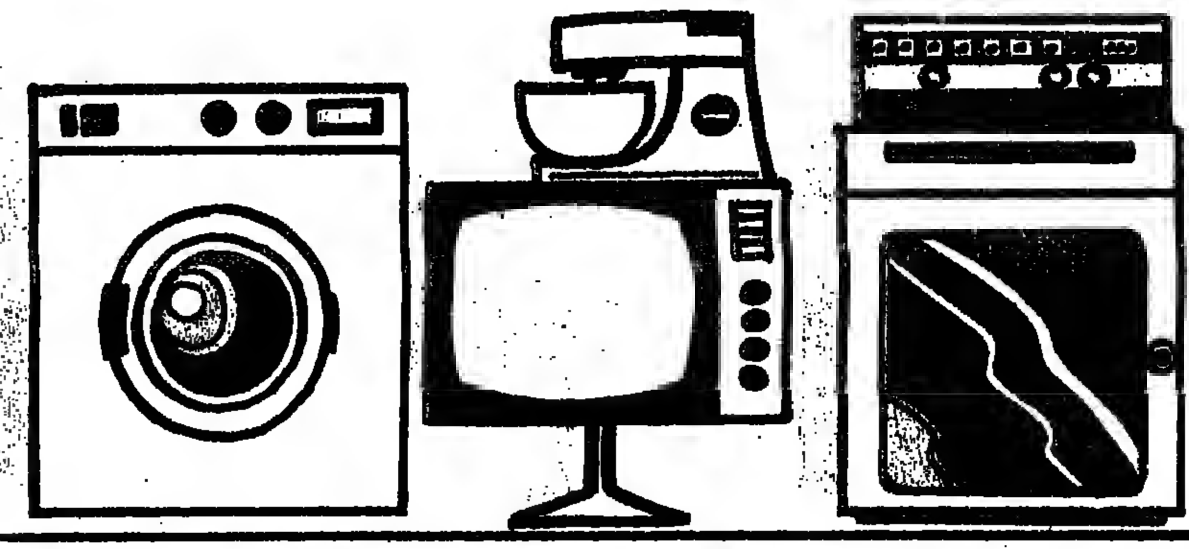

(3459)

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Applicants aged 30-40 years should have a professional attitude with a proven sales track record of at least 3 years. A knowledge of the "training scene" would be very dealable but the drive and ability to sell effectively at all levels is much more important.

Contact: Bev Stevens

Senior Programmer
Rugby **Up to £8,000**

An engineering organisation, forming part of a larger international group, is seeking a Senior Programmer to play a leading role in a major systems development programme. The installation is technically up in date with opportunities to be involved in projects using database, on-line and datacomms techniques.
Applicants should have at least 4 years IBM COBOL programming experience preferably using DOS combined with the ability to lead a team. A knowledge of CICS and/or DL/1 would be an advantage.

Contact: Bev Stevens

Project Leaders
Lake District **£9,000 – £11,000**

A large organisation involved in chemical processing is seeking a number of people at Project Leader level. Initially, the work will be oriented toward strategic investigations within commercial, production and technical fields. More conventional projects will emerge from these studies with systems being developed for mini and main frame computers.
Applicants should have experience of or a qualification in a numerate discipline e.g. OR or Physics; with a background in computing. The ability to undertake fundamental analysis and communicate effectively will be particularly significant.
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Contact: Bev Stevens

Computing Capacity Management
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A senior vacancy exists for a Technical Specialist within a well known national group. The successful candidate will have responsibility for the capacity management and planning of all group computing facilities.
Applicants should be mature with a strong technical background involving large Honeywell and IBM main frames. Experience of systems software, on-line/communications, configuration development, performance monitoring and enhancement are all particularly relevant.

Contact: Bev Stevens

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A highly respected mini computer company wishes to recruit experienced Engineers for commissioning and maintenance work in the above location.
Practical knowledge of mini computers would be desirable but is not essential as full training will be provided as appropriate. Successful applicants must possess sound business sense and the ability to act in a thoroughly professional manner.
These positions offer excellent career prospects for the right people.

Contact: Mike Gaitskell

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Our client is a large and successful international distribution group. They seek a Senior Programmer to bring V77 expertise into the computer department and play a major role in the development of distributed network systems and database applications supported by up to 30 V77's installed over the next 3 to 5 years.
Applicants should have 2 years COBOL experience and must have had practical involvement in the use of V77 hardware and operational software.
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If you feel that your skills would be more fully utilised in this role than in your present position, then please contact us for an initial discussion.

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UNIVERSITY OF LONDON COMPUTER CENTRE

COMMUNICATIONS SYSTEMS

The University of London Computer Centre provides a National Computer Service to Universities throughout Southern England. The Centre is equipped with Control Data 7600, 6800, 6400 and Cyber 72 computers and supports an extensive communications network of remote batch and interactive terminals. As the first stage of a development programme leading to the installation of an extremely high-speed processor and a bulk file store, a powerful new general-purpose support processor is to be installed during 1981.
A new front-end system is under development, which will support a common user interface both to the existing machines and to the new processor. This system will also provide gateway facilities to PSS and other national networks in order to allow ULCC users to access the facilities of other computing centres and to make the computational resources at ULCC available nationally.
The system is based on a hierarchy of processors from microprocessors to powerful mini-computers. Full use is being made of internationally agreed protocols such as HDLC, X.25, X.29, and the emerging standards for file and job transfer will also be adopted. Staff at the Centre have the opportunity to influence the development of these standards.
There are opportunities for both hardware and software designers and implementers to contribute to this major development in the front-end system itself and in the mainframe operating system interfaces to it.
Academic qualifications to degree level will be required. Experience of communications systems would be an advantage, but the main requirements are for an open and receptive mind and an enthusiastic and tenacious approach to tackling and solving problems.
Salary will be according to age and experience in the range £4765 to £9595 per annum plus £987 London Weighting. The Centre offers excellent conditions of service and operates the Universities Superannuation Scheme.
Further details and application forms are available from Mr. N. Savage, Assistant Secretary, University of London Computer Centre, 20 Guilford Street, London, W.C.1. Telephone No.: 01-405 8400, Ext. 241.
Closing date for completed application forms 28th November, 1980.

(3450)

Computer Manager

£8,000-£9,000

Despite the uncertain economic climate of recent years, Kitson's have grown nearly five-fold since 1975 and are now one of the country's leading companies in the thermal insulation field.
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For this Senior position applicants must have designed and implemented at least 1 major system. Experience of Technical as well as Commercial applications would be an advantage, though not essential. Must be able to supervise staff. Very good company benefits.

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If you are interested in any of the above positions, please phone for an application form or write giving full details.

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An established background in field engineering based on DEC PDP hardware and software is required, and knowledge of CDC printers and disk sub-systems would be a great advantage.

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For a strictly confidential discussion, please contact Miks Hassian. Ref. CW 287.

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(3410)

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Systems Analysts Analyst Programmers

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The positions are based at Dampier, Tom Price and Paraburdoo and computing hardware consists of large HP3000's at each site.

Applications are database orientated and IMAGE/QUERY and VIEW are used extensively for database and screen handling. FORTRAN is the major language used. Installation of DS/3000 to link the computers in a network is underway and mine planning and geological applications are being developed using state-of-the-art interactive graphics equipment.

Hamersley's commercial systems run on an IBM mainframe in Perth with an SNA network providing access from the Pilbara sites.

Applicants should have a strong FORTRAN background, be familiar with database and be capable of working with a minimum of supervision. HP3000 experience and/or interactive graphics experience is desirable but not essential.

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Please write with full details of age, experience, qualifications etc., to Milton Stothard, Senior Personnel Officer–Recruitment, Hamersley Iron Pty Limited, Box A42, GPO, Perth, W Australia 6001.

Computer Manager

The Arts Council exists to promote the Arts within Great Britain by subsidy. The Council now plan to introduce, at their West End Offices, a mini-computer for administration and accounting, followed, in one or two years, by other applications.

A computer manager is required to be responsible to the Finance Director for the introduction and day to day operation of the computer systems and to assist in identifying and meeting the user's additional requirements for computer systems.

Applicants must have evident management abilities and wide computing experience with particular emphasis on accounting and administration applications. In particular, the Arts Council is looking for someone with the skill and enthusiasm to develop computer systems which will improve its services to the Arts.

Salary will be within the range of £9,616 to £11,516, plus non-contributory pension scheme, and a season ticket loan can be arranged. The post carries 22 days' annual leave plus 2½ days each year added to bank holidays.

Please apply in writing to: Miss Sue Yates, Personnel Officer, The Arts Council of Great Britain, 105 Piccadilly, LONDON W1V 0AU, giving full details of experience and qualifications, or telephone 01-629 9495 for a fuller job description.

Closing date: 24th November

Arts Council OF GREAT BRITAIN

(3462)

CONTRACT? RING 01-439 3671 HEXAGON

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An ICL 2980 provides the main University Computing Service; extensive use is made of remote CDC 7600s and a VAX 11/70 system will be installed in 1981 to provide an interactive facility. The post involves liaison with, and education of users of all these computers, and some technical authorship. Salary will be on a scale within the range £4795-£11575 according to age and experience.

Further details, and application forms which must be returned by 24th November are available from: The Director's Secretary, Oxford University Computing Service, 13 Banbury Road, Oxford OX2 6NN. Tel: Oxford (0865) 56721.

CEP/BMM
23/10/80

(3453)

KING'S COLLEGE LONDON COMPUTER UNIT

Applications are invited for the post of

PROGRAM ADVISOR

[illegible]

Further particulars from the Computing Manager, Computer Unit, King's College London, Strand, London WC2R 2LS [illegible]

(3463)

UNIVERSITY OF DURHAM

PROGRAMMING ADVISOR FOR SOCIAL SCIENTISTS

Applications are invited from graduates with relevant experience for the post of Programming Advisor in the Computer Unit from 1st January, 1981. The primary duty will be to join a small team providing advice for social scientists and others using the statistical packages available on the NUMAC 370/168; some software maintenance duties on these packages are also involved. Candidates should have considerable computing experience and preferably a higher degree in social science.

Salary in the range £5,505 to £11,575 per annum on national grade 1A or 2 according to qualifications and experience.

Applications (3 copies) naming 3 referees, should be sent to: The Registrar and Secretary, Science Laboratories, South Road, Durham DH1 3LE, from whom further particulars may be obtained.

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Salary (NJC/APTC Grade 3): £5307 to £5856 — under review — including London Allowance, according to age, experience and qualifications. Application forms and further particulars can be obtained from: R. A. Fennell, Assistant Secretary, Roehampton Institute of Higher Education, Richardson Building, Digby Stuart College, Roehampton Lane, London SW15 5PH.

(Applicants should note that, although this appointment will be at Southlands College, they may be required to work elsewhere within the Roehampton Institute)

Analyst/ Programmer

Swindon

We require an experienced analyst/programmer to assume responsibility for support of an accounts system at the NERC Headquarters and for its implementation throughout the Council's institutes.

This vacancy is in the Management Information Service which is responsible for supplying administrative computing facilities throughout NERC and providing a centralised management information system.

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The post will be graded at Higher Scientific Officer/Senior Scientific Officer level.

Applicants should have a degree or equivalent qualification with several years experience in commercial data processing, plus a knowledge of FORTRAN.

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Further information and application forms are available from: Mrs. P. Judson, Natural Environment Research Council, Polaris House, North Star Avenue, Swindon, Wilts SN2 1EU. Telephone: Swindon (0793) 40101 Ext. 432

Please quote ref: 018.

Closing date: 27th November, 1980.

Natural Environment Research Council

[illegible]

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The Division uses its own mini and micro computer development systems to support software product development. Currently installed machines include two PDP 11/34's and a TI990/10, and a VAX 11/780 is to installed for a major new language product to be developed over the next two years.

Systems Designers Limited is a British computer systems consultancy specialising in mini and micro-based systems for the highly demanding Defence and Industrial real-time fields, and also in exciting new developments such as Ada. In 11 years the company has grown to 240 professional staff whilst retaining its independence and individual management style. The Company is expanding steadily in the UK and has recently won a number of contracts in Europe and the United States.

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For an application form and Company brochure, telephone Sue Watts, asking the operator for Freefone 3179 or write to Sue Watts at:
Systems Designers Limited
Systems House, 1, Pembroke Broadway,
Camberley, Surrey GU15 3XH

13449

Head of Software and Programming

Kingston, Surrey **c. £9,500**

This well-established (over 100 years), international construction company has a communications network of some 20 terminals with several commercial on-line systems up and running. Other on-line systems are under development and more are planned.

The Head of Software and Programming will work closely with the DPM and other senior managers within the company, (including Directors) on the analytical side and must have sufficient experience to contribute relevant ideas of his/her own. Another area of responsibility is liaison with manufacturers about hardware, operating systems and associated software.

Our client is looking for someone with at least 5 years experience (including a good knowledge of COBOL), who has taken at least one project through to completion and who has the ability to supervise a team of analyst/ programmers and programmers.
Please quote ref: CW160-A

Analyst/Programmers

New ME 29 Installation + T.P. and Database

Croydon **Salary to c. £10,000+**
Mortgage Subsidy + Other Benefits

A new ICL ME 29 installation, in the Croydon area, needs two more Analyst/Programmers to work on completely new development projects. The company is part of a large international group and specialises in the General Insurance area. The installation will use TPS to control an in-house and remote terminal network, and IDMS database.

Terms of employment are excellent. An extremely attractive basic salary (to £10,000 according to experience), a mortgage subsidy (down to 9%), very good pension and protective insurance schemes, flexitime, and normal other benefits.

What do we want from you? At least 3 years experience as a COBOL Programmer, with involvement in systems analysis and design - you will have total responsibility for your own system. Some T.P. experience would be a major advantage. Other relevant experience could include working in an insurance environment, with mini computers, small ICL hardware and database.

Please telephone immediately for a discussion quoting ref: CW 159-J. We intend to conduct final client interviews between 6th and 12th November.

CAPP ASSOCIATES **01-686 9693**

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c. £12,000 P.A.

Our clients are Commodity Brokers working on a worldwide basis in the Metal and Soft Commodity Industries.
The decision has been made to appoint an M.I.S. Manager who will report direct to the group's headquarters in Chicago and will be responsible for developing all European DP facilities supporting branch offices in London, Hamburg, Amsterdam, Zurich and Geneva.
If you can portray experience in line with all or some of the following requirements we would like to discuss this highly attractive opportunity with you:

1. A minimum of 5 years' experience in DP with a sound COBOL programming and systems design background.
2. Specific experience gained from working in an environment using mini computers and/or terminal hardware desirable.
3. Your mainframe experience is likely to relate to an IBM background.
4. A high level of academic achievement is sought supported preferably by a degree.

This position calls for a person able to accept a high degree of responsibility with the necessary self motivation, and to work well with all levels of user management in Europe and the USA. You will be expected to spend a number of weeks initially in Chicago familiarising yourself with the existing DP applications running on two 370/158s under OS/MVS.

Ring us now to arrange for an immediate appointment

PSQ4

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SENIOR PROGRAMMERS

E. LONDON **to £8,000**

Our clients are recognised leaders in the leisure industry who are looking for a Senior Programmer for their IBM installation. The situation is on the East London-Essex borders. The computers are 370s with 4341s on order.
Applicants should have around 4 years' experience of COBOL on IBM equipment and ideally will have CICS experience.
In addition to the salary the company offers a Christmas bonus, paid overtime, 5 weeks' annual leave and a staff shop. D.4719

RPG II PROGRAMMERS

LONDON CITY **to £8,000**

A well established software house specialising in insurance and banking systems are recruiting RPGII Programmers. You should have at least 18 months' experience preferably with IBM hardware and gained ideally within a financial environment. Client contact is expected and applicants will be dealing with management at all levels. These positions offer excellent scope for capable programmers who wish to enhance their careers by utilising the latest IBM software and in-house developed database systems. M.4724

BASIC +/BASIC + 2

VARIOUS LOCATIONS **to £8,000**

We are continuously hearing of new vacancies for programmers and analyst/ programmers in BASIC, BASIC+, BASIC+2 or AIMS. Experience ranging from JUNIOR to SENIOR LEVELS could open opportunities in BANKING, INSURANCE, LEISURE or SOFTWARE HOUSES located in ESSEX, THE CITY, BERKS, SAUDI ARABIA and HANTS. Experience with DEC, PDP or SYSTIME equipment would be particularly relevant especially if combined with FINANCIAL or ENGINEERING background. R.GEN

ICL PROGRAMMERS

ESSEX **to £8,500**

Our clients are manufacturers of quality home products who are situated on the Essex/Herts borders. The location is accessible from both East Anglia and London.
They seek COBOL Programmers with a minimum of 2 years' experience gained preferably on commercial applications. Chances exist for progression into Analysis. In return they offer a good salary, 4-5 weeks' annual leave paid at time and a half, subsidised company products and a bonus of up to 8%. D.4812

RPG II ANALYST

LONDON CITY, IBM SYS 32, 34, 38 **to £10,000**

An excellent opportunity has arisen for experienced Analyst Programmers to progress into consultancy. Ideally you will have at least three years' IBM RPGII experience, one of which should involve systems work. Applications will revolve around banking and insurance projects and will include database, communications, and financial planning and modelling. Applicants must be of smart appearance and have been educated to A level standard. An excellent benefit package is offered and futuristically will include a car. M.4720

PROJECT LEADER

SURREY **to £12,000**

Our client is the computer division of a well-known group of companies, who have recently expanded their processing power very significantly, to cater for a heavy systems development plan. The company require an experience PROJECT LEADER with in depth knowledge of PAYROLL systems to complement their friendly systems development department. A minimum of six years experience at a senior level working in COBOL will be needed by the successful applicant. R.4770

JUNIOR ANALYST

S. W. ESSEX **to £7,500**

An excellent opportunity has arisen for a very good programmer or Analyst/ Programmer to make the transition into SYSTEMS ANALYSIS. Modern UNIVAC equipment is utilised in the department and a large data communications network has been established. A variety of batch and on-line systems are in operation and development is still taking place. In addition to the salary, a bonus of approx. 8% is paid. R.4675

PROGRAMMERS & ANALYSTS

SURREY ICL 2900 COBOL **to £9,000**

Our client is a well-established insurance company, situated within easy reach of Surrey, Sussex and London, who seek to extend their D.P. staff in the New Year.
They require COBOL programmers with at least one year's experience and analysts with not less than two years. In all cases a knowledge of the 2600 range is expected.
In return they offer a good pension scheme, a mortgage and a relocation package. D.4654

The above vacancies are only a small selection from those currently on our files and we are always delighted to talk to experienced systems and programming staff wishing to further their careers.

(3491)

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Saudi Arabia **up to £15,000 tax free plus allowances.**

Our client, a well established communications organisation with many diverse interests worldwide, is to appoint two customer engineers to join a newly formed support group based in Jeddah.
Candidates must have at least two years' experience of servicing DEC processors and peripherals. A recognised qualification and/or knowledge of software would be an advantage.
A very attractive package on permanent married status. **Contact: Jim Baker**

Consultant
Information Retrieval Systems

London **to £10,500 + profit share**

This is a unique opportunity for an experienced computer information retrieval specialist to join one of the UK's foremost services organisations.
The company wishes to appoint a consultant with a computer background who has been responsible for the implementation of a system in library, information or documentation centre. Candidates should have some knowledge of at least one proprietary package in the field, such as STAIRS, STATUS, DIALOG, ASSASSIN or ORBIT.
Applicants will be expected to have the personality and communication skills to carry out client projects without detailed supervision. They should also be able to contribute to the continuing development and marketing of packages and services in this area.
Excellent opportunity to progress in an interesting and professional environment.
Contact: Margaret Stevens

CICS & DL/1 Programmers

London **£10,500 + Mortgage**

Join a highly professional group of data processing specialists, whose main activity is to finalise the functional specifications for a new International Banking System. Development will be undertaken by a number of teams including one specialising in all technical support areas, and systems programming capabilities.
The organisation is seeking various levels of expertise, but to apply a minimum of three years sound commercial experience of COBOL and CICS from a large IBM environment is essential. Knowledge of DL/1 and IBM 4300 series would be a definite advantage.
Responsibilities and financial reward will depend on the level of experience of each individual. Opportunities to learn new techniques are coupled with good salaries and an excellent benefits package. **Contact: Janet Chilvers**

Senior Systems Analyst

London **c. £10,500+**

A large, well known organisation operating on an international basis require additional expertise in their systems development area.
It is essential to have a minimum of five years experience in an IBM COBOL environment and candidates should have some knowledge and practical experience of financial applications and on-line systems. The ability to communicate effectively is of prime importance.
This is an excellent opportunity to progress in a challenging and professional environment. **Contact: Isobel Bruce**

Data Processing Manager

South London **c. £10,500**

We have been retained by a large international organisation who are omnipresent makers in the European industry, to recruit a Data Processing Manager to take responsibility for their UNIVAC 90/30 site.
Candidates must have at least five years experience in D.P. having gained extensive knowledge of RPGII and some form of database.
This knowledge coupled with exposure to an ASSEMBLER language and a basic appreciation of communications is essential. Successful applicants will be expected to undertake some form of analysis, be mature enough to handle the budgeting of the department and be able to show a flair for management and have the ability to delegate.
Contact: David Hendry

HP3000 Software Specialist

London **neg. to £10,000**

SCICON has an unsurpassed reputation for its technical ability and expertise in the development of advanced systems and software. To meet the demand for efficient and versatile systems they now require an experienced Hewlett Packard software technician to provide system support in the development teams. Responsibilities will also include the management of in-house machines. To qualify for this position candidates will have at least 2 years practical experience of HP3000 and have an in-depth knowledge of the internals of MPE, IMAGE and QUERY. An appreciation of the hardware structure and the ability to configure systems would be desirable assets.
An excellent opportunity to progress in a challenging and professional environment.
Contact: Margaret Stevens

Analyst/Programmers

Jersey – Three year assignment. **to £9,300**

Due to considerable systems development over a long term plan our Client wishes to strengthen the project teams with experienced Analyst/Programmers to cover a 3 year period.
Successful applicants will be assigned to specific application areas, covering initially, financial systems as well as assuming an instructive role for junior team members.
Ideal qualities would be 3 years COBOL on ICL 2904 or similar, a strong analysis background and possibly exposure to structured programming techniques. Experience of mini computers would be an added advantage.
Single status preferred, though married applicants without children will be equally considered. **Contact: Brian Postles**

Programmer

Kent **c. £6,500**

A well established international organisation has a vacancy for a Programmer to join a team developing commercial applications.
The company currently operates an ICL 1900 but is expecting to up-grade the installation next year.
Applicants should have at least eighteen months experience of COBOL, preferably on ICL equipment and be enthusiastic to develop real-time, on-line and database systems.
This is an ideal opportunity to work in a professional environment and learn new techniques. **Contact: Jim Baker**

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£7K +	Instructor/technical support for peripheral manufacturer - Reading area.
£5K +	Young engineer to train on micro systems based in Central London.
£5K +	Terminal engineer for Sussex/Surrey, no previous computer experience required.
Overseas	Technical Managers required for 3 different clients all supporting mini systems within the Middle East.

Capp Associates specialise in computer engineers, and can help you find a position suited to your skills and experience.
Our clients require personnel at all levels from junior engineers to UK service managers, so if YOU are looking for a step up, telephone or write to our Engineering Consultant - Phil Chapman.

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UNIVERSITY OF GLASGOW

ADMINISTRATIVE DATA PROCESSING

PROGRAMMER/ ANALYST

Applications are invited from suitably qualified persons for the post of Programmer within the Administrative Data Processing Section of the University Registrar's Office. Data Processing primarily provides a student record data processing service to the Registry and Court Offices. All administrative systems are currently run on the University's ICL 2076 computer. It is planned that a substantial microprocessor system will be purchased to provide online processing for the Records and Examinations Office. The person appointed would be involved in both the maintenance of current systems and the new programming applications which are planned.

Applicants should hold a University degree or equivalent professional qualification. Preference will be given to those with experience of programming or analysis in a data processing environment. Salary will be on Grade 1A of the scales for Other Related Staff (£6505-£9595, under review), with initial placement dependent upon age, qualifications and experience.

Further particulars may be obtained from the Secretary of the University Court (Room 18), University of Glasgow G12 8QQ, with whom applications (8 copies), giving the names and addresses of three referees, should be lodged on or before 21st November, 1980.

In reply please quote Ref. No. 4791.

(3499)

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Please ring Ernest Morris or John Haywood on 01-606 4040; or send your cv to Edward Simpson, Ref. SC80/30 at the address below.

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UNIVERSITY OF SOUTHAMPTON

PROGRAMMING STAFF

The University Computing Service is seeking additional programming staff to assist in the support and development of its Service. The Service provides extensive batch and interactive facilities based currently on three local systems — a dual ICL 2970, a Honeywell 6680 and a PDP 11/45, and uses facilities at London and Manchester Universities remotely. In addition to the support of mainframe services a Microcomputer Development Service is being established and development work is being carried out in the areas of communications, with an emphasis on campus networks, the rationalisation of facilities, data base usage, and the development of user support techniques.

Applicants should possess a degree or equivalent, and have relevant experience (for certain posts an engineering background would also be an advantage).

The appointment will be in the salary range 1B or 1A: £4795-£8585 per annum. The starting salary will depend upon qualifications and experience.

Applications (2 copies), giving curriculum vitae, qualifications and experience and the names and addresses of two referees, should be sent to Mrs. P Vaughan-Smith, Staffing Department, The University, Southampton SO9 5NH, from whom further particulars may be obtained. Please quote ref: 1197/A/CW.

(3498)

THE UNIVERSITY OF GLASGOW

DEPARTMENTS OF MECHANICAL ENGINEERING AND NAVAL ARCHITECTURE

COMPUTING ASSISTANT

Applications are invited for the post of Computing Assistant. Minimum requirements are a Scotec Certificate in applicable mathematics or Computer Studies with at least 2 years' experience, or an equivalent combination of experience and qualifications.

Appointment will be made according to qualifications and experience. Salary range £3,339-£4,950.

Applications, including a curriculum vitae and the names and addresses of two referees should be sent to Professor J. D. Robson, Department of Mechanical Engineering, University of Glasgow, Glasgow G12 8QQ before 17th November, 1980.

In reply please quote Ref. No. 4765

(3497)

WELSH NATIONAL SCHOOL OF MEDICINE
(UNIVERSITY OF WALES)
DENTAL SCHOOL

RESEARCH OFFICER

(preferably a graduate in Engineering or Physics with a knowledge of and interest in computer programming) required in the Department of Restorative Dentistry for a project upon the measurement of strain in denture bases using radio telemetry. The project is funded by the SRC initially for three years. The successful candidate will also have the opportunity to work in association with the Department of Medical Physics and the Department of Medical Statistics of the Welsh National School of Medicine. Commencing salary £4,765.

Candidates who wish to discuss the post, should contact Dr. D. O. Stafford (Cardiff 755944, Ext. 2616). Further particulars and application forms (quoting ref. no. DS15/80) available from the Administrative Officer, Dental School, Welsh National School of Medicine, Heath Park, Cardiff, CF4 4XY (Ext. 2489), to whom applications should be submitted as soon as possible.

(3494)

QUEEN MARY COLLEGE
University of London

PROGRAMMER

An experienced Programmer is required to assist research teams solving problems in fields including satellite and optical communications, and power systems. Applicants should be graduates with a knowledge of FORTRAN and ALGOL. The Programmer will have access to the QMC ICL 2980 and London University CDC 7600 computers. Opportunities to assist with programming of mini- and micro-computers. Salary scale (under review) £6472-£10582 p.a., including London Allowance. Please apply by letter, enclosing curriculum vitae and names of two referees, to The Secretary, Queen Mary College, Mile End Road, London E1 4NS, not later than 21 November.

(3448)

UNIVERSITY OF STIRLING
DEPARTMENT OF COMPUTING SCIENCE

Senior Lecturer/ Lecturer (3 Posts)

Applications are invited for three lecturer posts in Computing Science one of which will be at a senior level. It is hoped to make one appointment in the business data processing area and another in the systems software area. The appointment will commence on 1st January, 1981 or as soon as possible thereafter.

Salary Scales: Lecturer £5505-£11575, Senior Lecturer £11165-£13980 (both under review).

Applications stating post and area of interest, together with the names of three referees, should be submitted by 24th November, 1980, to the Secretary, University of Stirling, Stirling FK9 4LA, from whom further particulars may be obtained.

(3471)

PROGRAMMERS

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NEW PROJECT : NEW OPPORTUNITIES

SOFTWARE DESIGN ENGINEERS

The advent of a new class of submarine for the Royal Navy brings with it fresh opportunities for a system approach to the proposed weapon fit.

As a significant part of a multi-million pound contract Vickers Shipbuilding Group Ltd. Weapons Department have been designated CO-ORDINATION AND SYSTEM DESIGN AUTHORITY with responsibility for overall system design development and performance amongst other tasks.

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1. Specification, design and implementation of software modules for submarine weapon guidance and target analysis systems using high and low level language.
2. Analysis of Mathematical and Statistical methods particularly those concerned with target tracking (e.g. digital filtering technique).
3. Assessment of overall system considerations concerned with the procurement of a total ship weapon system.

Experience of submarine operations would be desirable.

QUALIFICATIONS AND EXPERIENCE

Honours degree or equivalent in maths or applied science plus at least 3 years experience of Software design for Military and Industrial real-time systems.

The positions are open to both men and women.

Please write with details of age, qualifications and experience to:

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(3215)

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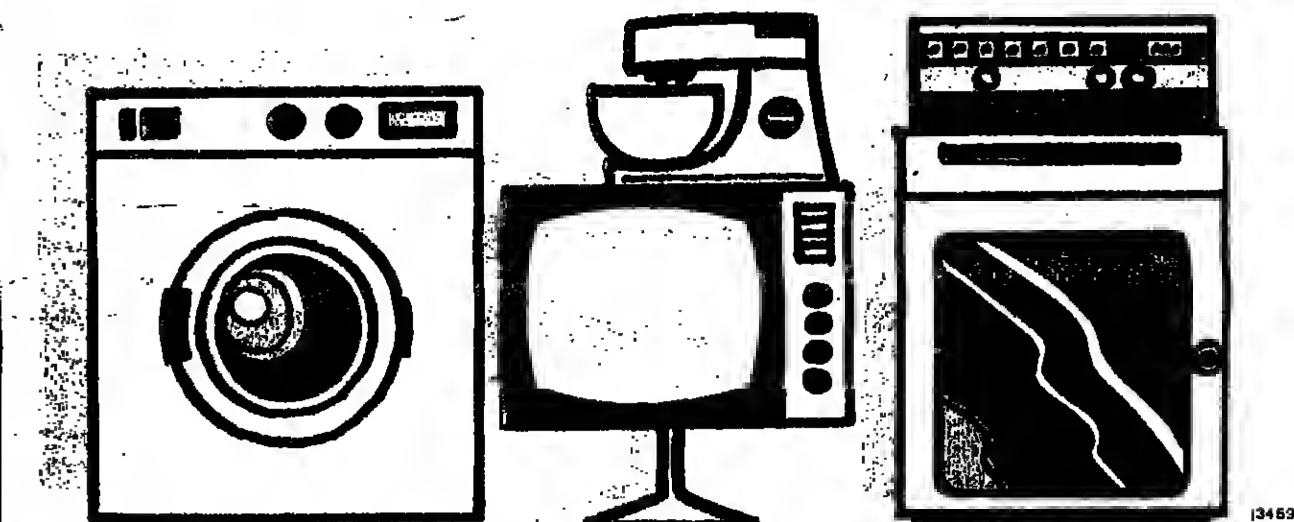

(3469)

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COMPUTER WEEKLY CLASSIFIED

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the newspaper computer people rely on

THE SALES BIT

Earnings of a competent salesman

THE process of sales recruitment usually starts with the drawing up of a job specification. During this process one of the significant questions is to establish what are the expected gross earnings on the achievement of sales target.

However, within my own organisation we usually ask a couple of supplementary questions. What is the sales target for the first year, and what did your average salesman earn last year?

These questions are real pointers to the truth of what the competent salesman is likely to earn with such a company and what he will be expected to sell relative to working for some other company in the same sector of the computer industry.

Arbitrary

Sales targets tend, by and large, to be arbitrary amounts, often the subject of a sales manager's whim, which neither directly reflects a company's total revenue objectives, its position relative to its direct competitors, nor the economic environment in which the company operates. They rarely, if ever, take into account the reality of economic fluctuations and are typically applied in a draconian manner where the only adjustment can be upwards.

For instance, I knew of two direct competitors in the minicomputer arena, one of whom currently has an annual sales target per salesman of just over £250,000, while the other's equivalent is over £450,000, yet both give approximately the same gross annual target earnings of some £16,000.

I was speaking to the national sales manager of a service bureau last week who was being slightly apologetic that the annual target earnings for the job vacancy he had was about £1,000 below the going market rate. When I pointed out that the annual target of £30,000 compared more than favourably with competitors who demanded an annual sales performance nearer £100,000 he began to see the significance of balancing targets, not only to total company objectives, but also to the "right" level of earnings for salesmen.

Guarantees

The question related to what the typical salesman earned last year is not so much relative to the "achievability" of the sales targets the company sets its salesmen; it is more a measure of the competitive status of the company and the capability of its existing sales-force.

So much for target-earnings, but what about minimum guarantees against commission earnings for the initial period of employment?

Most companies offer a minimum income guarantee for period of either six or 12 months. However, my own company has a client who guarantees income at a declining rate for up to 18 months and another where the arrangement ceases after three months.

In truth, few of the guarantee periods I see set by computer companies make any real sense. Like sales targets, they are often arbitrary periods decided upon because they have the apparent merit of "sounding about right", or the same as their competitors give, rather than being the function of factors that reflect the operation of the companies sales department, its products and the marketplace in which it sells.

Of course, there can be no precise formula for establishing the initial guarantee period, but there are factors from which a company can construct a guarantee which is generally compatible with its modus operandi.

The principal factors to be considered are education, induction/orientation and the selling-cycle. It is both reasonable and necessary for the new recruit to be given a fixed period of training, even though it may not happen all at once. Three months is a fairly typical figure for a computer manufacturer.

Induction

Then there is induction at the branch level, getting to know the people, where to obtain sales support, handling sales documentation, and generally discovering how things are run. Out on the patch there are existing and prospective clients to meet, learning how to get around the territory, etc.

Then there's the length of the selling-cycle — a real "piece-of-string" question. Yet most companies have a pretty good idea of the typical period it expects to elapse between first contact and the closing of the sale — say six to nine months for a minicomputer manufacturer.

If one adds these factors together, catering for any acceptable overlap, the resulting figure should represent a reasonable guarantee period for the average competent salesman: in this case ten to 13 months (say, one year) for a minicomputer manufacturer.

There will always be people who fall short as well as those who quickly exceed guaranteed minimum income, but one advantage to sales managers of having realistic guarantee periods, particularly rather than ones that are too short, is the avoidance of the emotional hassle of having to renegotiate with clearly good quality salesmen because success has not occurred faster than the market norm.

Uncertain

This is especially true of a market subjected to economic recession where decision periods tend to extend. The other advantage is a reduction of the risk of prematurely thrusting back on to the job market those salesmen who are uncertain of their ability to survive beyond too brief a guarantee period.

I feel it is time for sales management and salesmen alike to bring some sensibility to the subject of guarantees against potential commission earnings in order to create a balance between the distraction of short-term insecurity and the danger of providing a haven for "guarantee hoppers".

TRADER

Puzzle Answer

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     650
   68782
   68782 +
  138214
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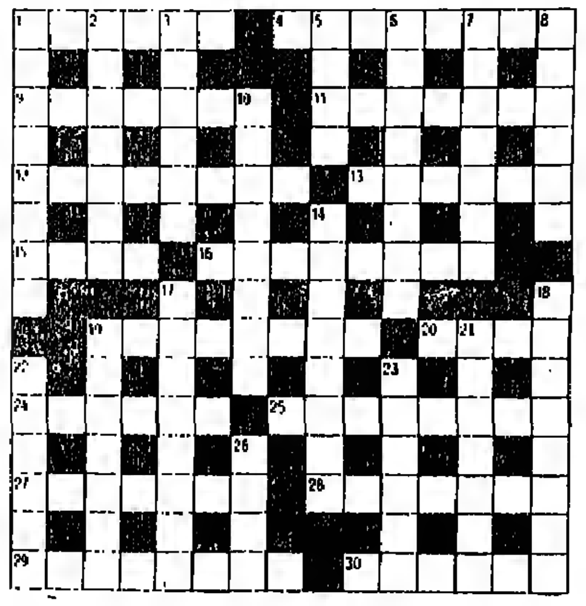
CW Prize Crossword 10

Compiled by Alec Robins

A prize of £10 will be awarded for the first correct entry opened. The second and third solutions opened will receive £5 each. Entries to Crossword Competition, Computer Weekly, Dorset House, Stamford Street, London SE1 9LU, by first post Friday, November 14. Please use a ballpoint to complete the crossword.



Name.......................................(Miss, Mrs, Ms, Mr)

Address...

....

Telephone...

I accept the rules and conditions of the Computer Weekly Crossword Competition.

Signed.............................. Date..............................

ACROSS

1. Is taken in by arty female – ill-treatment results (6)
4. Sick, obese editor is unlucky (3-5)
9. Remedy that you have when your guitar's broken? (7)
11. Springs up and declaims about right (7)
12. Highlander's sword can disturb or calm ye (8)
13. A brace left inside the two-seater car (6)
15, 16. One's not expected to win in a row with a stranger (4,8)
19, 20. Establishment of innocence – freed and gone off (6,2,4)
24. Split a pound, making payment for a letter (6)
25. Navvy, for example, having a party with Her Majesty (8)
27. Summary by judge, ultimately, must be scrupulously exact (7)
28. It's enormous – isn't it an iceberg? Not all of it's visible (7)
29. Small fish – grip back with an effort (8)
30. A politician elected before the current measure (6)

DOWN

1. Handy treatment provided by the healer's profession? (8)
2. Support us, sunk in shame (7)
3. Policemen turn up around the border, making pinch (6)
5, 6. Oft rows erupt in the Upper House, yet is unable to speak (4,3,5)
7. One gives a heavy beating for a whopping lie (7)
8. The Governor, grabbing the girl, is frustrated (6)
10. Plunderer, a rude drunk, after spoil (8)
14. Having a sound correspondence with fool concerning worker (8)
17. Dissolute rake tucking into 29? That's odd (8)
18. Interval during play at recent clash (8)
19. It's fashionable to obtain fish around the North (7)
21. Imprisonment was speedy with Mussolini about (7)
22. Come casually into conversation, with hunting-whip raised (4,2)
23, 26. Pants? That's usual, perhaps, when climbing steep hills (6,4)

RULES AND CONDITIONS

1. Each competitor may submit no more than one entry.
2. The competition is open to all readers of Computer Weekly with the exception of the staff of IPC Business Press Ltd, any printers employed by them or the near relatives of any such staff.
3. The solution of each puzzle will normally be published in the issue three weeks after the puzzle has been published.
4. Winners will receive their prizes during the month following the competition.
5. The decision of the editor on the interpretation of the rules and conditions and on all matters shall be final. No correspondence will be entered into.

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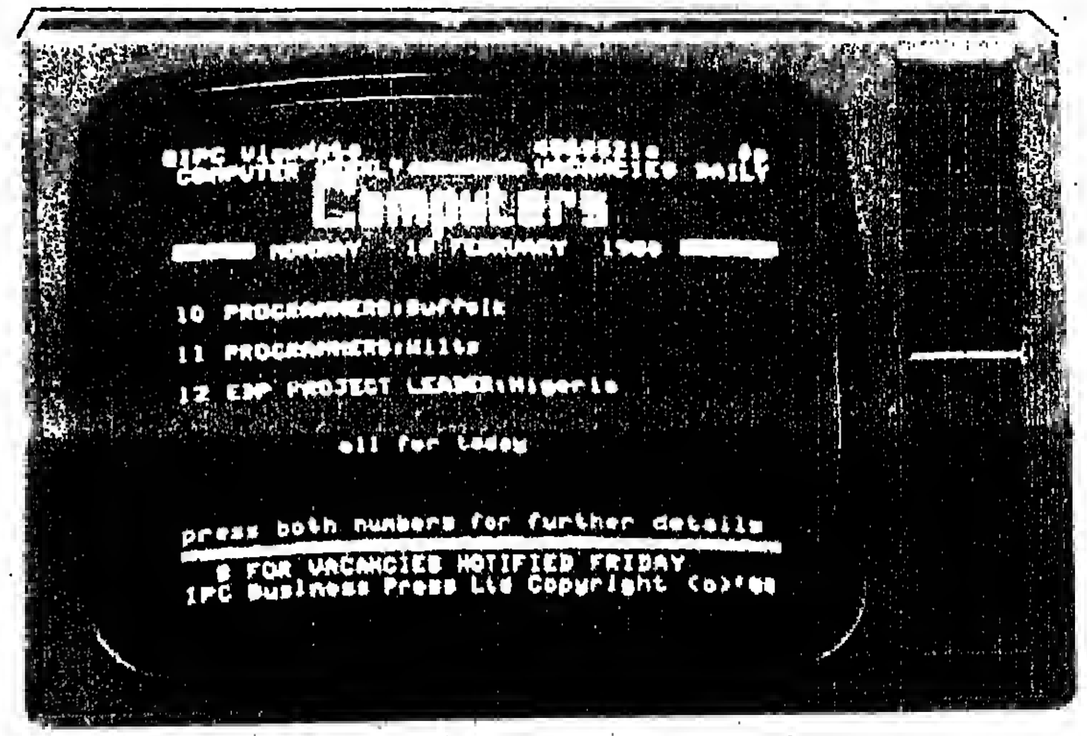

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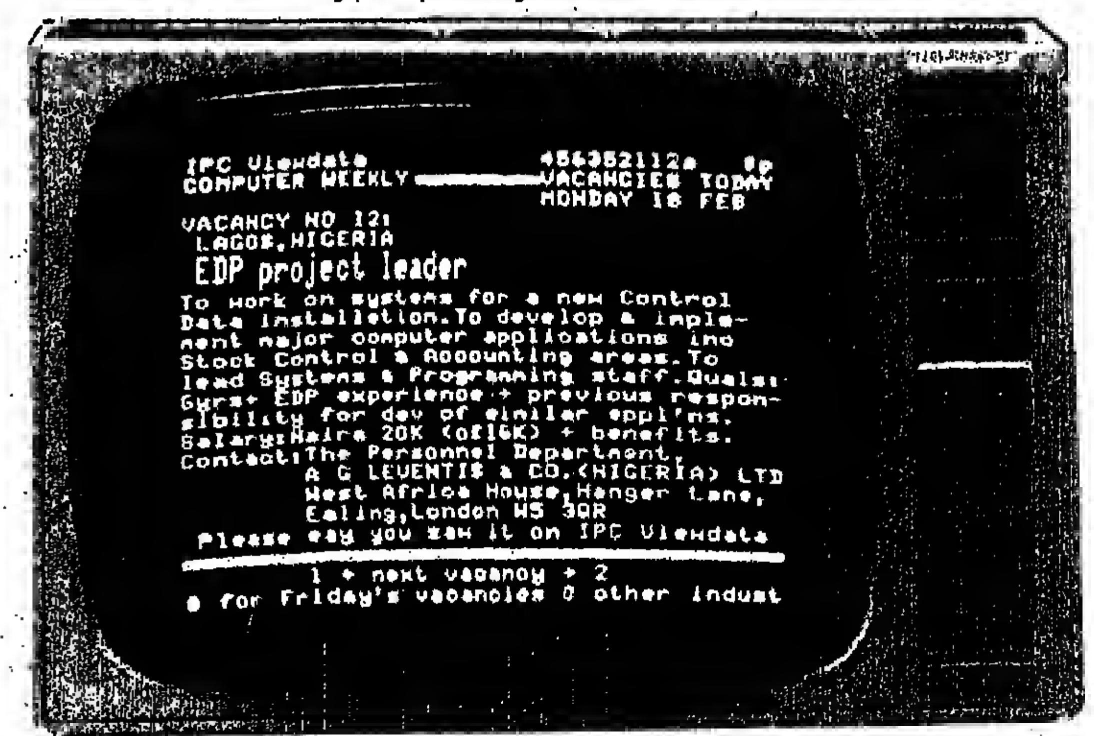

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